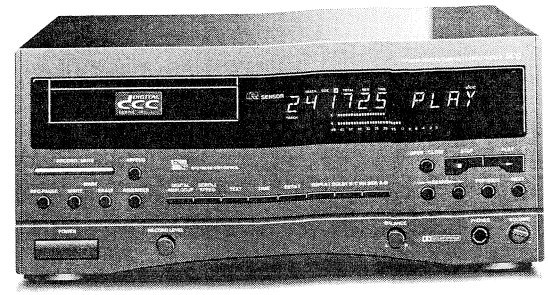
Digital compact cassette recorder 70DCC091/00
70DCC450/00/05/17

Service
Service
Service



Service Manual

DIGITAL dcc COMPACT CASSETTE

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GB 48 22 725 24902

PHILIPS

PHILIPS

CS 46 300

TECHNICAL SPECIFICATION

GENERAL:

Power supply	: 115 / 230V ±15% switchable
Power consumption	: 30W max. 8W max. in stand by
Dimensions (w x h x d)	: 260 x 115 x 312,5 mm
Weight	: 2,5kg

DIGITAL I/O:

Format	: AES/EBU according IEC958
Sampling frequency	: 32kHz / 44,1kHz / 48kHz ±0,1%
Unbalanced cinch	: 75Ω

ANALOG IN *(digital recording from analog input)*

Sampling frequency	: 44,1kHz
Input sensitivity	: 150mV
Max. input voltage	: 2,5Vrms
Input impedance	: 50kΩ

ANALOG OUT *DCC PLAYBACK (DAC performance)*

Output voltage	: 2Vrms ±2dB (0dB digital level)
Frequency range	: 20Hz..14,5kHz at fs = 32kHz 20Hz..20kHz at fs = 44,1kHz 20Hz..22kHz at fs = 48kHz
Amplitude linearity	: ±0,5dB
Phase non-linearity	: 5° max. at 1kHz
Channel unbalance	: <1dB at 1kHz
Output resistance	: 300Ω
Outband attenuation	: 60dB above 30kHz
Channel separation	: >85dB at 1kHz >75dB at 20Hz..20kHz
Muting (search)	: >100dB
SNR	: >87dB (>89dB A-weighted)
THD + noise	: >83dB at 1kHz >82dB at 20Hz..20kHz

ANALOG OUT *DCC RECORD & PLAYBACK (ADC & DAC performance)*

Output voltage	: 2Vrms ±2dB
Frequency range	: 20Hz..14,5kHz at fs = 32kHz 20Hz..20kHz at fs = 44,1kHz 20Hz..22kHz at fs = 48kHz
Amplitude linearity	: ±1dB
Phase non-linearity	: 5° max. at 1kHz
Channel unbalance	: <2dB at 1kHz
Output resistance	: 300Ω
Outband attenuation	: 60dB above 30kHz
Channel separation	: 79dB at 1kHz 65dB at 20Hz..20kHz
Muting (search)	: >100dB
SNR	: >87dB (>88dB A-weighted)
THD + noise	: >83dB at 1kHz >81dB at 20Hz..20kHz

ANALOG OUT *ACC PLAYBACK*

Output voltage	: 0,8Vrms ±50mVrms (200nWb/m)
Amplitude linearity	: 40Hz..14kHz within 7dB 250Hz..10kHz within 5dB
Channel unbalance	: <3dB at 1kHz
Output resistance	: 300Ω
Channel separation	: >26dB at 1kHz >59dB for non rel. tracks
Muting (search)	: >90dB

SNR (DIN reference level, 315Hz/0dB)

Dolby-mode	Fe (type I)	Cr (type II)
Dolby off	>48dB	>50dB
Dolby B	>56,5dB	>58,5dB
Dolby C	>65dB	>67dB

THD	: <2% at 1kHz/0dB : <2% at 1kHz/-10dB

HEADPHONE OUTPUT *DCC PLAYBACK*

Output voltage	: >5Vrms
Frequency range	: 20Hz..14,5kHz at fs = 32kHz 20Hz..20kHz at fs = 44,1kHz 20Hz..22kHz at fs = 48kHz
Amplitude linearity	: +1/-2dB
Channel unbalance	: <4dB
Output impedance	: 170Ω
Load impedance	: 32 / 120 / 600Ω
Output power	: 38 / 68 / 48mW

AUDIO SPECIFICATION AT 4Vrms in case of 600Ω load

Channel separation	: 75dB typ. at 1kHz
Muting (search)	: >100dB
SNR	: >86dB
THD + noise	: >82dB at 1kHz

RC5-CODE for DCC-sets

SYSTEM-CODE 23 (DCC)			
KEY	COMMAND-CODE	KEY	COMMAND-CODE
0	00	PREVIOUS	33
1	01	RECORD MUTE	42
2	02	OPEN/CLOSE	45
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8	08	PLAY	53
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(GB) WARNING
All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools at this potential.

(F) ATTENTION
Tous les IC et beaucoup d´autres semi-conducteurs sont sensibles aux décharges statiques (ESD). Leur longévite pourrait être considérablement écourtée par le fait qu´aucune précaution nést prise à leur manipulation.
Lors de réparations, s´assurer de bien être relié au même potentiel que la masse de l´appareil et enfileer le bracelet serti d´une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l´on utilise soient également à ce potentiel.

ESD

(D) WARNUNG
Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kann die Lebensdauer drastisch reduzieren.
Sorgen Sie dafür, daß sie im Reparaturfall über ein Pulsarmband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.
Halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

(NL) WAARSCHUWING
Alle IC´s en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen vermindern. Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

(I) AVVERTIMENTO
Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta incaso di non osservazione della più grande cauzione alla loro manipolazione. Durante le riparationi occorre quindi essere collegato allo stesso potenziale che quello della massa delápparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

(GB)
Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

(D)
Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Gerätes darf nicht verändert werden. Für Reparaturen sind Originalersatzteile zu verwenden.

(I)
Le norme di sicurezza estigono che l´apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambiago identici a quelli specificati.

(F)
Les normes de sécurité exigent que l´appareil soit remis à l´état d´origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.

(NL)
Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.

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English

Congratulations on your purchase of the Philips DCC 91 / DCC 450 Digital Compact Cassette deck.

DCC is the logical, digital successor to the Compact Cassette. It meets higher demands for sound quality, durability and style. DCC is the marriage of Compact Cassette to Digital Audio, and it forms a union that combines perfect sound and high convenience with great versatility.

Like Compact Cassette, DCC is a record and playback system that features both prerecorded and blank DCC's. With its advanced system of digital registration on tape, DCC is a Compact Cassette made digital and totally modernised.

On top of this DCC has a unique and practical advantage: it is compatible with its analogue ancestor. Users can play their existing analogue Compact Cassette collections on the new DCC cassette deck.

Important notes for users in the U.K.:

Mains plug
This apparatus is fitted with an approved moulded 13 Amp plug.
To change a fuse in this type of plug proceed as follows:
1 Remove fuse cover and fuse.
2 Fix new fuse which should be a BS1362 3 AMP, A.S.T.A. or BSI approved type.
3 Refit the fuse cover.

If the fitted plug is not suitable for your socket outlets, it should be cut off and an appropriate plug fitted in its place.

If the mains plug contains a fuse, this should have a value of 3 A. If a plug without a fuse is used, the fuse at the distribution board should not be greater than 5 A.

Note:
The severed plug must be disposed to avoid a possible shock hazard should it be inserted into a 13 A socket elsewhere.

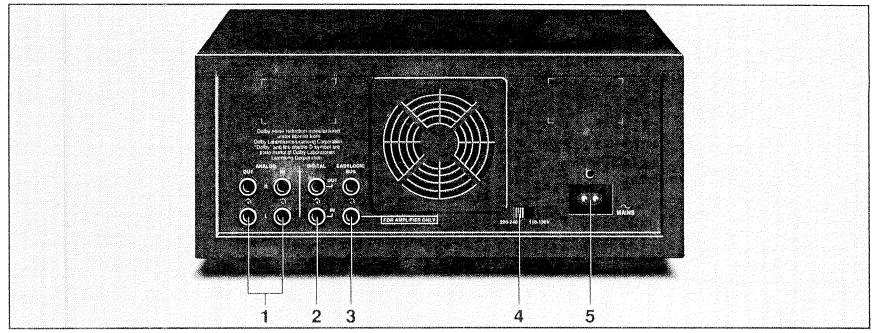
How to connect a plug
The wires in the mains lead are coloured in accordance with the following code: blue = neutral (N), brown = live (L).
As these colours may not correspond with the colour markings identifying the terminals in your plug, proceed as follows:
1 Connect the blue wire to the terminal marked N or coloured blue or black.
2 Connect the brown wire to the terminal marked L or coloured brown or red.
3 Do not connect either wire to the earth terminal in the plug, marked E or ⏚ or coloured green or green-and-yellow.

Before replacing the plug cover, make certain that the cord grip is clamped over the sheath of the lead - not simply over the two wires.

If in doubt, consult a qualified electrician.

Copyright:
Recording an playback of material may require consent. See Copyright Act 1956 and The Performer's Protection Acts 1958 to 1972.

English



INSTALLATION

WARNING
Do not connect the set to the mains until all other connections have been made and the mains voltage (indicated on the type plate) has been checked
(The type plate is located on the rear of the unit).

- Do not place the DCC deck in humid, too warm or hot areas (e.g. on top of the amplifier), near magnetic fields (e.g. TV) or in dusty rooms, as this will reduce the life of the unit.
- When positioning the units, put the DCC deck on the bottom of the stack.
- Keep a free space of a few centimeters around the unit and do not cover any vents.
- After you have positioned the unit correctly, it has to adapt to the new ambient temperature. Leave the DCC deck for about 30 minutes, to allow possible condensation water to evaporate.
  Failing to follow these instructions may cause damage to the electronics!

A few recommendations

- If the unit is not used for some time, switch the unit off and pull the mains plug out. By doing this, you will protect it from lightning damage.
- When you pull the mains plug out, do not take it by the cable, but by the connector shell.
- When you have pulled the mains plug out, do not touch the two contact pins, as the DCC deck needs a few seconds to discharge.

CONNECTIONS

1 ANALOG IN – Input sockets (L/R) for an analog audio signal.
- Insert the red plug into the R socket and the other plug into the L socket of your DCC deck.
- Insert the two other plugs into the DCC OUT sockets of your amplifier.

ANALOG OUT – Output sockets (L/R) of an analog audio signal.
- Insert the red plug into the R socket and the white plug into the L socket of your DCC deck.
- Insert the two other plugs into the DCC IN sockets of your amplifier.

2 DIGITAL IN – Input socket for a digital audio signal.
- Connection to a PHILIPS HiFi Mini System (type FW 60, FW 70, FW 80 or FW 91): insert one plug of the cinch lead into the input socket of your DCC deck and the other plug into the DCC OUT DIGITAL socket of your amplifier.
- Connection to another system: insert one plug of the cinch lead into the input socket of your DCC deck and the other plug into the DIGITAL OUT socket of your CD player.

DIGITAL OUT – This output supplies a digital signal via an electrical path; for this reason it can only be connected to a product with a digital input e.g. DCC or DAT.
- Use a cinch lead (not supplied) with one cinch plug on either end.

3 EASYLOGIC BUS (FOR AMPLIFIER ONLY) – Socket for connecting the DCC deck to a PHILIPS HiFi Mini System (type FW 60, FW 70, FW 80 or FW 91).
- Insert one plug into the EASYLOGIC BUS socket of your DCC deck and the other plug into the EASYLOGIC BUS socket of your PHILIPS HiFi Mini System.
  Note: CD SYNCHRO *(only DCC 91)* is only possible with this connection.

EASYLOGIC BUS – Socket for a possible connection to the EASYLOGIC input socket of another set, e.g. a CD player.
- Use a cinch lead (not supplied) with one cinch plug on either end.

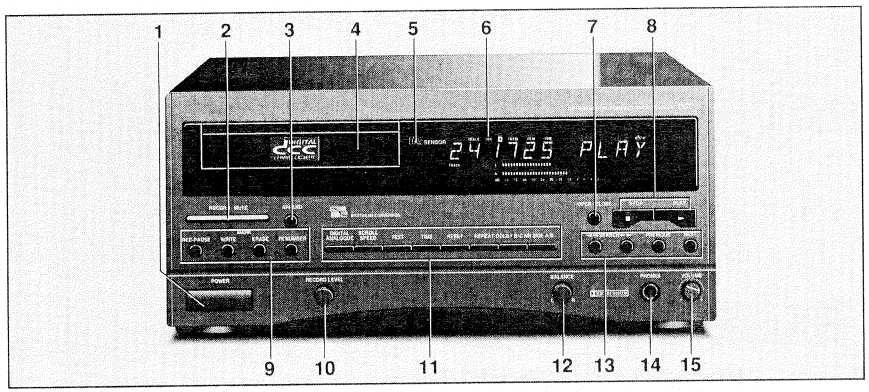
4 Voltage selector 220-240/110-120 V
- Select the mains voltage corresponding to the local mains voltage.

5 Mains
- Connect the smaller plug of the supplied mains cable to the MAINS socket of the DCC deck and the mains plug to the wall outlet.

After having made all the necessary connections (some may not be applicable for your set-up), your system is ready for use. In the next chapters we will describe how to operate it.

TABLE OF CONTROLS (GB)

English



FRONT PANEL:

1 **POWER** – For switching the unit on and off.

2 **RECORD/MUTE** – For recording from your chosen audio source and for recording 'digital silence'.

3 **APPEND** – For initializing a recordable (blank) tape or for searching the end of the last recording after which the recorder switches to the RECORD PAUSE mode.
It is advised to use this key before starting the actual recording with the RECORD/MUTE key.

4 **Cassette compartment**

5 **IR** – Infra red remote control eye ***(only DCC 450)***.

6 **Display**

7 **OPEN/CLOSE** – For opening and closing the cassette compartment.

8 **STOP ■** – For stopping the tape.

PLAY ► – For starting playback.

9 **REC-PAUSE** – For interrupting the recording temporarily and to enter the RECORD PAUSE mode.

WRITE MARK – For writing various markers.

ERASE MARK – For erasing various markers.

RENUMBER – For checking the complete tape for correctness of tracknumbers and making a correct sequence of tracknumbers.

10 **RECORD LEVEL** – For adjusting the recording volume only from the analog input. This knob has no effect on signals supplied by the digital input.

11 **DIGITAL ANALOGUE** – For selecting the type of the recording input.

CD SYNCHRO – For synchronising the start of recording with the start of a CD ***(only DCC 91)***.

SCROLL SPEED – For increasing the scrolling speed of text messages ***(only DCC 450)***.

TEXT – For calling text information.

TIME – For calling the time information.

RESET – For reseting the tape counter to '0000'.

REPEAT – For repeating the current track and to repeat the entire cassette.

DOLBY B/C NR – For selecting the DOLBY NR functions.

SIDE A-B – For selecting side A or side B of the tape.

12 **BALANCE** – For adjusting the balance during recording from the analog input. This knob has no effect on signals supplied by the digital input.

13 **SEARCH ►►** – For winding the tape forward.

SEARCH ◄◄ – For winding the tape backward.

PREVIOUS – For rewinding the tape to the beginning of the current or previous music track.

NEXT – For winding the tape to the next music track.

14 **PHONES** – Socket for headphones.
You may connect a pair of stereo headphones with 6.3 mm plug to this socket.

15 **VOLUME** – For adjusting the volume of the headphones.

(GB) CASSETTES

English

DIFFERENT TYPES OF CASSETTES

On your DCC deck you can use Digital Compact Cassettes (**DCC**) and conventional Analogue Compact Cassettes (**ACC**).

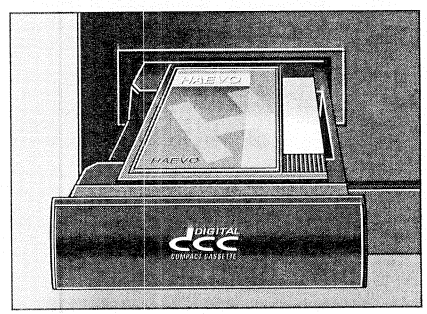
Both cassettes are available in various lengths and tape materials. The DCC and the ACC can be used in the DCC deck. The DCC has a cover designed for quick and easy handling.

DCC prerecorded ... can be bought prerecorded in the shops and can only be used for playback.
The prerecorded DCC can display information like text, track numbers, playing times and tape counter.

DCC user-recorded ... the recording will be made by you.
The user-recorded DCC can display information like track numbers, playing times and tape counter.

When inserting the DCC please observe the following points:

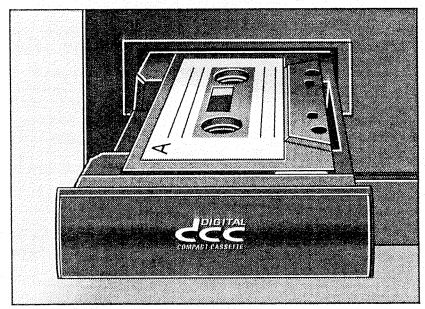
- Insert the DCC lengthwise into the open tray.
- The inscription must be face up.
- The protective slider must be on the right side.



ACC ... has been recorded with an 'analog cassette recorder' and can only be used for playback on the DCC deck.
The ACC can only display the tape counter.

When inserting the ACC please observe the following points:

- Insert the ACC lengthwise into the open tray.
- The inscription must be readable from the right side.
- Make sure that the ACC is not dirty or damaged as this could affect the operation of the unit.

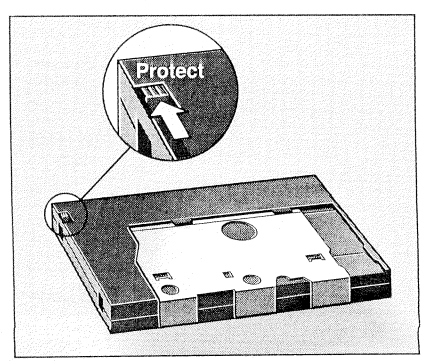


CASSETTE MAINTENANCE

- Keep the cassettes at room temperature and avoid leaving them in the sun or too close to magnets and transformers of e.g. recorders, radios, TV's and loudspeakers.
- Do not push the tape protection of DCC cassettes aside and avoid touching the tape.
- Always keep the DCC and the ACC in the cover after use to avoid damages.

PROTECTING A CASSETTE AGAINST RECORDING

Accidental overwriting of recordings made on your DCC cassettes can be prevented by sliding the red switch on the back of your cassette upward as shown below.
No recording will then be possible on both sides of this tape.



SWITCHING ON/OFF AND STANDBY

• Press the **POWER** key to switch the power on and off.
– After being switched on, the recorder becomes active and checks if a tape has been inserted.
If the unit does not find a cassette, the display shows: NO CASSETTE.

• The unit can be switched to the standby mode by pressing the **STANDBY** key on the remote control.

• Pressing one of the basic functions on the unit cancels the standby mode and reactivates the unit:

PLAY ▶,
STOP ■,
PREVIOUS,
NEXT,
SEARCH ◀◀ or ▶▶,
REC-PAUSE,
APPEND,
CD SYNCHRO *(only DCC 91)*,
OPEN/CLOSE.

MULTI LANGUAGE

By pressing the **LANGUAGE** key on the amplifier you can select the following languages to display messages on the DCC recorder:

– English
– French
– Spanish
– German
– Portuguese
– Italian.

We were proceeding on the assumption that the DCC recorder is connected to a PHILIPS HiFi Mini System (type FW 80 or FW 91).
If you have connected it to another system, the MULTI LANGUAGE function will not work. In this case all display messages will appear only in English.

LOADING A CASSETTE

• Press the **OPEN/CLOSE** key to open the tray.
OPEN appears on the display.
– The instruction to open can be given from any function with the exception of RECORD, CD SYNCHRO *(only DCC 91)* and RENUMBER.

• Insert a cassette as explained before.

• Close the tray by pressing **OPEN/CLOSE** again. You can also close the tray by a short slight pressure to its front.
The display shows CLOSING.

– After closing the tray your DCC deck will read the tape information.

If you have inserted a DCC, READING will appear on the display. During this period your DCC deck will:
– determine the tape sort used
– determine the tape position
– read the title of the current track (this process may take a few seconds).

– When a **prerecorded DCC** is loaded, the current track title indication will be displayed.

– When a **user-recorded DCC** is loaded, the recorder will enter the track-time display mode. As soon as this information is available on the tape it will be displayed.

– When an **ACC** is loaded, the counter mode will be displayed.

Note:

– If a rewound DCC is inserted, the unit automatically searches the beginning of the first music track.

– When playback is started in the middle of a user-recorded track, the time and track information may not yet be known by your DCC deck.
The display will then show '– – + absolute time' or the counter setting (when no time is recorded at current position).
As soon as a new track is detected, the track and time information will be shown on the display again.

– When you switch the unit off, the tape information of the cassette (various texts and times) is erased from the unit's memory. When you switch it on again, the tape information is re-read.

Playback of a cassette is similar to operating a CD-player.

1 Open the tray by pressing **OPEN/CLOSE**. OPEN appears on the display

2 Insert a cassette as explained before. (see page 6)

3 Close the tray. The display shows CLOSING.
The recorder will now retrieve the information on the tape and during this period READING appears on the display.
When using a prerecorded DCC, the current track title will be displayed.

4 Press **PLAY ▶**.
Playback will start from the present position of the tape.
The display shows PLAY or the track title for a prerecorded DCC.

5 Press the **STOP ■** key to stop playback.

When playing a user-recorded tape, the track number and time will be displayed just like a CD. In case this information is not (yet) known by the player, the track number will be indicated by '– –' and the display will show the current time indication or a counter setting (e.g. 0000).

PREVIOUS/NEXT TRACK

The **PREVIOUS** and **NEXT** keys can be used to search for a particular track on the tape or scroll through the tracklist.

• Press **PREVIOUS** *once* to search for the start of the current track.
• Press **PREVIOUS** *twice* to search for the start of the track previous to the current track.
• Press **NEXT** to search for a track next to the current track.

– If one of the two keys is pressed several times, the forward or backward step increases by one music track for each depression of the key.
– When using a user-recorded DCC or an ACC, the display will indicate the backwards or forwards step, e.g. TO +3.
– If these keys are pressed during playback, the deck will wind/rewind to the next/previous track after which playback continues.
– If you choose this function in STOP while the text indication is being selected, the required track is displayed. Press the **PLAY ▶** key to select the displayed track and start playback.

Note:
– These keys are also functional when using analogue compact cassettes. This function reacts to silent passages of at least 4 seconds between the tracks.

SEARCHING FOR A PASSAGE

Searching for a passage during playback can be done with the **SEARCH ◀◀** and **▶▶** keys.
• Hold **SEARCH ▶▶** pressed down to search in the tape travel direction.
• Hold **SEARCH ◀◀** pressed down to search in the opposite direction in which the tape is travelling.
– Playback will continue as soon as you release the key.

• When you press the **SEARCH ◀◀** and **▶▶** keys while the deck is in the STOP mode, the winding will continue until you press another key of the playback controls.

REPEAT

The **REPEAT** key can only be pressed in PLAY and STOP mode and switches between 2 different repeat modes. By pressing the same key once again, the next mode is called.
OFF → TRACK REPEAT → REPEAT CONT → OFF

• Press the **REPEAT** key (= TRACK REPEAT).
After playback has finished the unit repeats the current music track until you stop this function.

• Press the **REPEAT** key again (= REPEAT CONT).
The unit repeats the entire cassette without interruption until you stop this function.

• Press the **REPEAT** key again (= OFF).

Note: When analogue cassettes are used, only the function REPEAT CONT can be activated. TRACK REPEAT does not work.

REVERSING THE PLAYING DIRECTION

• The **SIDE A-B** key is used to reverse the direction in which the tape is travelling. This selected side is indicated on the display as [B] or [A]. When you press this key during playback, the playing direction will be reversed and playback will be continued at the other side of the tape.

Note: This function can only be selected in STOP, PLAY and REC-PAUSE.

DOLBY NOISE REDUCTION

The Dolby Noise Reduction function will only be active when you are using conventional compact cassettes.

• Use the **DOLBY B/C NR** key to switch the Dolby NR system on or off and to select Dolby B or Dolby C NR. To call the next mode, press the same key again.
OFF → DOLBY B → DOLBY C → OFF

English

Remember: The prerecorded DCC and the ACC cannot be used for recording!

The two major controls that are used to make a recording are the **APPEND** key and the **RECORD/MUTE** key.

1 Insert as explained before a blank DCC on which you want to make a recording.

2 Close the tray.

3 Press the **APPEND** key.
The deck will search for the start of side A and writes a buffer area (LEAD IN). This buffer area is written to guarantee optimum tape-recording conditions.
During this period APPEND and LEAD IN will appear on the display.
Then the recorder will enter the RECORD PAUSE mode. The display will show RECP.

4 Select the correct input source using the **DIGITAL ANALOGUE** key (as described under 'SELECTING THE INPUT')

5 In case you want to record from the analogue input, adjust the recording level using the **RECORD LEVEL** key (as described under 'RECORDING LEVEL')

6 You can now start recording by pressing the **RECORD/MUTE** key. The display will show REC.

7 Press **STOP** ■ to stop recording.
The actual recording is stopped immediately. The deck will continue to write for a short period. During this period a marker is written on the tape to mark the end of the last recording. The display will show APP and then STOP.

This procedure will ensure the correct recording of time and track numbers on the tape.

For better understanding of the APPEND function we refer to 'RECORDING EXPAMPLES' (page 11).

SELECTING THE INPUT

Before starting a recording you should select the correct input source with the **DIGITAL ANALOGUE** key.
You can select 2 positions:

ANALOGUE – selecting a source which is connected via the ANALOG IN sockets to your DCC deck.
The display shows ANALOGUE.

DIGITAL – selecting a source which is connected via the DIGITAL IN socket to your DCC deck.
The display shows DIGITAL.

Note: During a recording it is not possible to change the selected input.

RECORDING LEVEL

Adjusting the recording level is only needed when you are recording from a source which is connected via the ANALOG IN sockets to your DCC deck.
The recording level is monitored when the deck is in the RECORD PAUSE (RECP) mode.

- Adjust the recording level with the **RECORD LEVEL** knob so that the red part of the level control briefly lights up during dynamic passages.

INTERRUPTING A RECORDING

- You can interrupt the recording temporarily by pressing the **REC-PAUSE** key during recording.
  The deck will stop recording.
  RECP will appear on the display to indicate that the RECORD PAUSE mode is entered.
- Press the **RECORD/MUTE** key to continue recording.
  The recording starts again (REC) with a new tracknumber indication on the display.

RECORDING A DIGITAL SILENCE

- A 3-second silent recording can be obtained when you press the **RECORD/MUTE** key during recording.
  MUTE appears on the display during these 3 seconds after which the deck switches to the RECORD PAUSE (RECP) mode.
- Press the **RECORD/MUTE** key to continue recording.
  The recording starts again (REC) with a new tracknumber indication on the display.

Note: This function is very useful to separate music tracks by a 3-second pause.

Copyright:
Recording or copying is only authorised if there is no violation of copyright or other rights of third parties.

English

CD SYNCHRO (*only DCC 91*)

If the DCC deck is connected to the EASYLOGIC BUS socket of the amplifier, you can synchronise the start of a recording with the start of a CD or CD program as follows:

1 Insert a blank DCC in your DCC deck and a CD in the CD player.

2 To select the input source, press the **DIGITAL ANALOGUE** key. Make sure that the DCC deck and the CD player are connected via the digital or analogue sockets respectively (as described under 'SELECTING THE INPUT').

3 Now press the **CD SYNCHRO** key. The CD player is automatically started by the DCC deck. The recording of the music tracks, the absolute time and the track numbers starts immediately. The display shows CD SYNCHRO START.

Notes:

- When using the analogue input source the track number is automatically increased by one, providing that the digital silences between the tracks on the CD are longer than 4 seconds.

- If you want to add a recording to a partially recorded DCC, press the **APPEND** key before you start CD SYNCHRO. This will ensure the correct tracknumbering. The APPEND function searches for the next possible recording position.
  – If the remaining time of the DCC is less than the total playing time of the CD, the CD will not be completly recorded. The display shows TAPE FULL.

- If the end of side A of the DCC is reached during recording of one track:
  – the CD player goes to the beginning of the current track and waits,
  – the DCC deck rewinds to the beginning of the current track, writes a REVERSE MARKER and changes to side B.
  – the CD player is automatically restarted by the DCC deck and CD SYNCHRO continues.

- If you press the **CD SYNCHRO** key while the CD player is switched off or switched on but with no CD inserted, the DCC deck will wait for 10 seconds. Then the display will show CD ERROR (see also 'TROUBLESHOOTING').

- You can stop CD SYNCHRO by pressing the STOP key on either the DCC deck or the CD player. Then the display will show CD SYNCHRO CANCELLED.
  – If you press **STOP** ■ on the DCC deck, you will only stop the recording, but the CD player continues playing.
  – If you press **STOP** on the CD player, both CD player and DCC deck will stop.

- During CD SYNCHRO recording all keys are inactivated with the exception of the **STOP** ■ key and the **STANDBY** key (on the remote control).

- The system allows only one CD SYNCHRO recording at a time. If you try to start CD SYNCHRO while another CD SYNCHRO recording is taking place (e.g. synchronised recording from CD player to cassette deck), the display will show CD SYNCHRO ACTIVE.

GENERAL

- To correct possible mistakes on the display, press the **RENUMBER** key after the last recording (see chapter 'RENUMBER').

- Track and time information will not be recorded when the recording is done in the middle of a blank area on the tape with the use of the **REC-PAUSE** key. A correction of the tracknumbering with **RENUMBER** is not possible (see chapter 'RENUMBER').

- During RECORD PAUSE, the unit constantly tests the input signals. The copy protection is only tested when DIGITAL has been selected. If the chosen recording source is copyrighted, recording cannot be started (see chapter 'TROUBLESHOOTING').

- If DIGITAL has been selected, the unit checks if a digital source has been connected. If the digital source is missing (e.g. bad cable connection), recording can not be started (see chapter 'TROUBLESHOOTING').

- ***Only DCC 450:*** With some amplifiers it is possible that there will be a whisteling sound in RECORD PAUSE mode. To avoid this noise, you can select the recording source before you press the APPEND key. In this case you cannot listen to the last few seconds of the previous recording.

RECORDING EXAMPLES

(GB)

English

RECORDING ON A BLANK DCC

1 Insert a cassette and close the tray.

2 Press **APPEND**.
The deck searches for the start of side A and writes a buffer area (LEAD IN).
This buffer area is to guarantee optimum tape-recording conditions.
APPEND and LEAD IN appears on the display.
After doing so, the RECORD PAUSE (RECP) mode is entered.
The deck is now ready to record track 1.

(• Select the correct input source and adjust the recording level when needed).

3 Press **RECORD/MUTE** to start the actual recording.
REC appears on the display

4 Press **STOP** ■ when you want to stop recording.
The recording will be stopped and the deck marks the end of the last recording.
The display will show APP and then STOP.

RECORDING ON A PARTIALLY RECORDED DCC

The tape must be positioned at an area where a recording is already existing.

1 Press **APPEND**.
The deck will search for the end of the last recording.
APPEND appears on the display.
When this has been found the last few seconds of this music track will be played back (APPEND PLAY), after which the RECORD PAUSE (RECP) mode is entered.

If the position is not the desired one, press again the **APPEND** key.

(• Select the correct input source and adjust the recording level when needed).

2 Press **RECORD/MUTE** to start the actual recording.
REC appears on the display

3 Press **STOP** ■ when you want to stop recording.
The recording will be stopped and the deck marks the end of the last recording.
The display will show APP and then STOP.

Note: The last few seconds of the previous recording are only audible
– if the DCC source is selected on the amplifier or,
– via the headphones output on the DCC deck.

COMPLETELY OVERWRITING A RECORDED DCC

1 Select side A with the **SIDE A-B** key

2 Press **SEARCH** ◂◂.
The deck will rewind to the beginning of side A and will stop automatically at the beginning of the tape.

3 Press **APPEND**.
The deck will now write a LEAD IN area at the beginning of side A and will enter the RECORD PAUSE mode (RECP).

(• Select the correct input source and adjust the recording level when needed).

4 Press **RECORD/MUTE** to start the actual recording.
REC appears on the display

5 Press **STOP** ■ when you want to stop recording.
The recording will be stopped and the deck marks the end of the last recording.
The display will show APP and then STOP.

RECORDING ON A SPECIFIC LOCATION

1 First, you must go to the location on the tape at which you want to make a recording by pressing keys like **NEXT, PREVIOUS, SEARCH** ◂◂ or ▸▸.

2 Press **REC-PAUSE**.
The deck will enter the RECORD PAUSE (RECP) mode at the current position.

(• Select the correct input source and adjust the recording level when needed).

3 Press **RECORD/MUTE** to start the actual recording.
REC appears on the display

4 Press **STOP** ■ when you want to stop recording.

Note: Correct time will only be recorded when the tape is positioned at a location where the absolute time is already recorded on the tape.

(GB) MARKERS

English

Markers are special signals on the DCC tape, marking certain positions on the tape.
Markers can be set automatically or manually.

Markers can only be written on user-recorded non-protected DCC cassettes!

The most frequent markers are:

– START MARKER
– NEXT MARKER
– REVERSE MARKER

START MARKER

A START MARKER marks the beginning of a music track. If this marker is written, you can easily find the beginning of the required music track.

– When you start recording, a START MARKER is automatically set.

– A START MARKER is also written each time a silence of 4 seconds is detected during recording (to indicate the beginning of a new track).

• To manually write a START MARKER press the **WRITE MARK** key during playback or recording. It will mark the beginning of a music track.

Caution: If you manually write a START MARKER, you will change the original sequence of tracknumbers. With the **PREVIOUS** key you can scroll trough the tracklist to check the correctness of the tracknumbers. If the tracknumbers are not correct, press the **RENUMBER** key.

REVERSE MARKER

A REVERSE MARKER marks the end of the last music track on side A. This marker can be written at the end of the recording of **side A**.
You notice that there is no more room on side A for the next music track (e.g. no.6) and you therefore want to change to side B:

• Interrupt the recording by pressing the **REC-PAUSE** key.

• Press the **SIDE A-B** key.
The unit writes a REVERSE MARKER and immediately changes the side. The tape will not be wound to the beginning of side B.

• Continue recording by pressing **RECORD/MUTE** key.
The continued recording will be included in the track-numbering as track no. 6.

When the reverse marker is detected during playback, the deck will automatically change to side B after which playback will be continued immediately on side B.

'LEAD IN' marks the beginning of the tape on side A.

NEXT MARKER

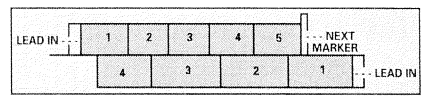
A NEXT MARKER marks the end of the last music track on this side. This marker can be written at the end of the recording of side **A and B**.
You notice that there is no more room on side A for the next music track (e.g. no. 6) and you therefore want to continue the recording at the beginning of side B:

• Interrupt the recording by pressing the **REC-PAUSE** key.

• Press the **WRITE MARK** key to write a NEXT MARKER.
The unit writes a NEXT MARKER, winds to the end of the tape (A–>B), changes the side and writes a LEAD IN area.

• Continue recording by pressing the **RECORD/MUTE** key.
The continued recording will be included in the track-numbering as track no. 1.

When the next marker is detected during playback, the deck will automatically wind to the beginning of side B after which playback will be continued with the first track on side B.



'LEAD IN' marks the beginning of the tape on side A and B.

ERASING A MARKER

Erasing a marker is only possible during PLAY or in STOP mode.

• First, you must go to the location on the tape at which you want to erase a marker by pressing keys like **NEXT, PREVIOUS, SEARCH** ◂◂ or ▸▸.

• Press the **ERASE MARK** key just before or on the marker to be erased. Your deck will now check whether there is a marker at that position. During this time the symbol MARK ERASE will flash on the display.
– After detection of a marker the unit will erase this marker. The display will indicate which marker has been erased: STRT (start marker), REV (reverse marker), NEXT (next marker) and APP (marks the end of the last recording).
– If the unit does not find a marker within 2.5 seconds, it switches to the previous position (PLAY or STOP).

• After you have erased a marker the sequence of tracknumbers has been changed. Press the **RENUMBER** key to correct the tracknumbering.

RENUMBER

– This function works only on a user-recorded DCC where at least the first track has been recorded with APPEND.
– Select the RENUMBER function to update the sequence of tracks of the DCC, when the correct sequence of tracknumbes has been changed due to adding an extra startmarker or erasing a startmarker.

• Press the **RENUMBER** key.
The unit winds to the beginning of side A and then checks both sides for their tracknumbers. If a tracknumber is incorrect or if a marker is badly set, they are corrected. The unit winds to the beginning of the first music track on side A and switches to STOP. The audio signal is muted.

Caution:
This process may take a few minutes.
This function should not be interrupted!

DISPLAY INFORMATION

DISPLAYING TEXT INFORMATION

The **TEXT** key is only functional when you are using a prerecorded DCC. It calls up information from the DCC to be shown on the display.
Normally the track title indication (TRACK TITLE) of the tape is displayed after loading the DCC.

- By pressing the **TEXT** key, you can successively call the following text information.

TRACK TITLE (current track title)
ARTIST (name of the artist)
ALBUM TITLE (title of the album)
SONG TEXT (text of the current track)
TOTAL TRACKS (total number of tracks and total time of the tape)

Note:
- When no text information is available as on a user-recorded DCC tape, the display will show NO TEXT INFO.
- If there isn't any song text available, SONG TEXT remains on the display.
- If the text information is longer than 12 characters, the message will be scrolled.
  Only DCC 450: In SONG TEXT mode the scrolling speed of the song text can be increased successively in 5 steps by pressing the **SCROLL SPEED** key.

DISPLAYING OTHER TIME INFORMATION

Normally the display shows the track numer and the elapsed playing track time.

- By pressing the **TIME** key, you can successively call the following time information.

TIME ... shows the period from the beginning of the track to the current position in minutes and seconds.

TOTAL TIME ... shows the period from the beginning of the cassette to the current position in minutes and seconds.

TOTAL REM TIME ... shows the period from the current position to the end of the cassette in minutes and seconds
(only for DCC prerecorded)

COUNTER ... shows the period from the beginning of the cassette to the current position.

REM TIME ... shows the period from the current position to the end of the side in minutes and seconds.
(only for DCC user-recorded)
This information can only be called during recording or in RECORD PAUSE mode when recording has been started at a position where the **TOTAL TIME** was known.

Note:
- Calling up time information (except counter) is not possible when conventional compact cassettes are used.

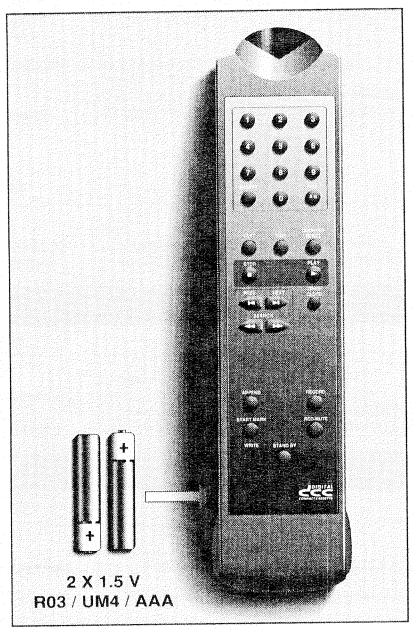
COUNTER RESET

- By pressing the **RESET** key, the tape counter will be set to 0000.
  When the display is not in the counter mode at the moment this key is pressed, it will show the counter setting 0000 for a few seconds and then return to the original display mode.

REMOTE CONTROL (GB)

English

This remote control is supplied with the DCC 450 only and not valid for the DCC 91. The DCC 91 is a part of the FW 91 HiFi Mini System with its own remote control.



The keys on the remote control have the same functions as the corresponding ones on the DCC deck.

Exception: RECORD/MUTE:

RECORD For recording from your chosen audio source.

REC-MUTE For recording 'digital silence'.

EXTRA KEYS

0-9 digit keys For selecting directely tracknumbers (only functional when using a DCC with a tracknumbering).

STANDBY For selecting the STANDBY mode.

BATTERIES

- Open the battery compartment and insert two batteries as indicated, type R03, UM-4 or AAA-cells.
- Remove the batteries when they have run down or when they will not be used again for a long period.

(GB) TROUBLESHOOTING

English

If a fault occurs, first check the points listed below before taking your DCC deck for repair.

1.
Problem: **NO POWER**

Cause: Mains lead is not connected securely.
Solution: Connect the mains lead.

2.
Problem: **NO SOUND**

Cause: Volume is not turned up.
Solution: Turn up the volume.

Cause: Wrong connections.
Solution: Connect the cables correctly.

3.
Problem: **SEVERE HUM OR NOISE**

Cause: Loose connections.
Solution: Make connections securely.

Cause: Unit is near TV/VCR.
Solution: Move TV/VCR away from unit.

4.
Problem: **UNEXPECTED SYMPTOMS**
e.g. system does not respond to any command

Cause: Electrostatic charge.
Solution:
- Switch off the power by pressing the **POWER** key.
- Switch the power on again after a few seconds.

5.
Problem: **INTERRUPTIONS IN SOUND**

Cause: Dirt on the DCC head.
Solution: Clean the DCC head by using special DCC cleaning cassettes.

6.
Problem: **REMOTE CONTROL: NO OR NO PROPER OPERATION POSSIBLE**

Cause: The distance between unit and remote control is too large.
Solution: Reduce the distance.

Cause: Wrong connections.
Solution:
- Check EASYLOGIC BUS connection to the PHILIPS HiFi Mini System or
- when connected to another system, remove this cable.

Cause: Batteries are incorrectly inserted.
Solution: Insert batteries correctly.

Cause: Batteries are empty.
Solution: Insert new batteries.

7.
Problem: **DISPLAY DOESN'T SHOW TRACK AND TIME INFORMATION** (prerecorded DCC's)

Cause: You have loaded a DCC with a lot of tracks (information) on it.
Solution: Press the **PLAY ▶** key. The DCC deck will start to read the tape information. As soon this information is available, it will be displayed correctly.

8.
PRESS STOP

Cause: You have pressed a key during a function which can not respond to this key.
Solution: Press the **STOP ■** key.

9.
TAPE BLOCKED

Cause: For some reason, the compartment cannot be openend or closed (e.g. cassette not correctly inserted, compartment touched an object when it was opened).
Solution:
- Be sure to correctly insert the cassette in the cassette compartment.
- Ensure that the compartment has sufficient clearance for opening and closing.

Note: Do not try to open the DCC compartment manually.

10.
NO CASSETTE

Cause: The compartment has been closed without containing a cassette.
Solution: Close the compartment after you have inserted a cassette.

11.
NOT PRESENT

Cause: The required track does not exist, playback is continued.
Solution: Select another music track.

12.
TRACK UNKNOWN

Cause: The required track does not exist on this tapeside.
Solution: Select an existing track number.

13.

Cause: The copy protection has detected that this recording is not permitted (record source copyrighted).
The DCC deck operates with a Serial Copy Management System, which includes that a fully digital copy can be made from prerecorded digital material but only directly from the original material. E.g. you can make a digital recording from a CD to your DCC via the digital in- and output sockets. However, it is not possible to make a ***digital*** copy of this recorded DCC cassette to another DCC deck.

Solution: Recording can only be made via the analogue in- and output sockets.

14.

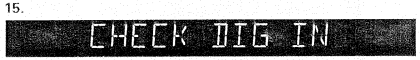
or DIGITAL symbol is flashing

Cause: The CD player does not send any signal in STOP mode.
Solution: Set the CD player to PAUSE or PLAY mode.

Cause 1: The digital source has failed (i.e. loosened cable), the unit is switched to STOP.
Cause 2: DIGITAL has been selected at the unit. If the digital source is missing, recording can not be started.
Solution: Check the connections and try again.

Cause: Some CD players do not send a digital signal according to EBU standard.
Solution: Contact the corresponding service organisation for your CD player.

15.



Cause 1: The digital source has failed (i.e. loosened cable), the unit is switched to STOP.
Cause 2: DIGITAL has been selected at the unit. If the digital source is missing, recording can not be started.
Solution: Check the connections and try again.

16.

Cause: The CD player does not send any signal.
Solution: Set the CD player to PLAY mode.

17.

Cause: You have inserted a data cartridge. The unit is switched to STOP.
Solution: Insert a music cassette in the compartment.

18.

Cause: There is no text information.
Solution: You have inserted a cassette in the compartment, which does not contain any text information.

19.

Cause: You have tried to start recording with an ACC.
Solution: Insert a DCC into the tray.

20.

Cause: You have tried to start recording with a recording protected DCC or a prerecorded DCC.
Solution: Push the red button on the user-recorded DCC down. On the prerecorded DCC you cannot make a recording.

21.

Cause: CD SYNCHRO has been selected but the CD player can not be started.
Solution: Make sure that,
– the EASYLOGIC BUS is correctly connected,
– the CD player is switched on,
– a CD is inserted into the CD tray.

22.

Cause: Only one CD SYNCHRO recording is allowed at a time.
Solution: Stop the other synchronised recording first and start CD SYNCHRO again.

23.

Cause: The DCC was not recorded by using the APPEND function. Therefore RENUMBER is not possible.
Solution: Please use the APPEND function for future recordings.

24.

Cause: The tracknumbering on this tape is not correct.
Solution: Press **RENUMBER** to update the sequence of tracks.

25.

Cause: Recording has been started using CD SYNCHRO but the playing time of the CD is longer than the available space on the DCC.
Solution: Use a DCC onto which the CD would fit.

Cause: Recording has been started using CD SYNCHRO but the CD track is longer than the DCC side.
Solution: Use a DCC onto which the track would fit.

Cause: You have tried to add a recording to a fully recorded tape by using the APPEND key.
Solution: Overwrite the recorded tape or use a blank DCC.

WARNING

If these remedies fail to help, consult your dealer, taking the **DCC recorder and the cassette** (with which the fault occured) with you. Under no circumstances should you try to repair the unit yourself as that would invalidate the guarantee.

MAINTENANCE

- Do not leave the unit for any length of time in direct sunlight or other places where high temperatures can occur, such as in the vicinity of heating apparatus.
- Do not expose the equipment to humidity or rain.
- A chamois leather cloth slightly moistened with water is sufficient for cleaning the deck.
- Do not use cleaning agents containing alcohol, spirits, ammonia or abrasives.

CLEANING CASSETTES

- In principle there is no need to clean the head of your DCC player when you use only DCC cassettes.

  The use of conventional compact cassettes of inferior quality may leave dirt on the DCC head. This can affect the sound quality of DCC cassettes (sound is being interrupted).

  Special DCC cleaning-cassettes are available to clean the DCC head.

  It is strongly advised not to use conventional compact cleaning cassettes as they will not clean the DCC head good enough.

ONLY USE SPECIAL DCC CLEANING CASSETTES FOR YOUR DCC DECK.

DO NOT USE DEMAGNITIZING CASSETTES

This product complies with the radio interference requirements of the European Community.

(subject to modification)

TECHNICAL DATA

INPUTS

Digital In:	
AES/EBU format:	according IEC958
sampling frequency:	32 / 44.1 / 48 kHz
unbalanced cinch:	75 Ohm
Analog In:	
cinch:	unbalanced
input impedance:	50 kOhm
sampling frequency:	44.1 kHz
input sensitivity:	150 mVrms
max. input voltage:	3 Vrms

OUTPUTS

Digital Out:	
AES/EBU format:	according IEC958
sampling frequency:	32 / 44.1 / 48 kHz
unbalanced cinch:	75 Ohm
Analog Out:	**DCC playback**
output voltage:	2 Vrms +/- 2 dB
frequency response:	20 Hz...20 kHz +/- 0,5 dB
channel separation:	88 dB (1 kHz)
THD+N:	86 dB (1 kHz)
SNR:	90 dB
wow and flutter:	quartz crystal precision
Analog Out:	**ACC playback**
output voltage:	0,8 Vrms +/-50 mVrms at 200 nW/m
frequency response:	40 Hz ... 14kHz (<3 dB)
channel separation:	26 dB (related tracks)
THD:	2 %
SNR:	Dolby OFF 55 dB
	Dolby B 64 dB
	Dolby C 73 dB
wow and flutter:	0,2 %
Headphone Out:	**DCC playback**
output power:	48 mW / 600 Ohm
frequency response:	20 Hz...20 kHz +/- 1 dB
channel separation:	75 dB (1 kHz)
SNR:	86 dB

DISMANTLING HINTS

DISMANTLING OF FRONT WINDOW
1. Release snap of front window (1)
2. Remove window (2-3)

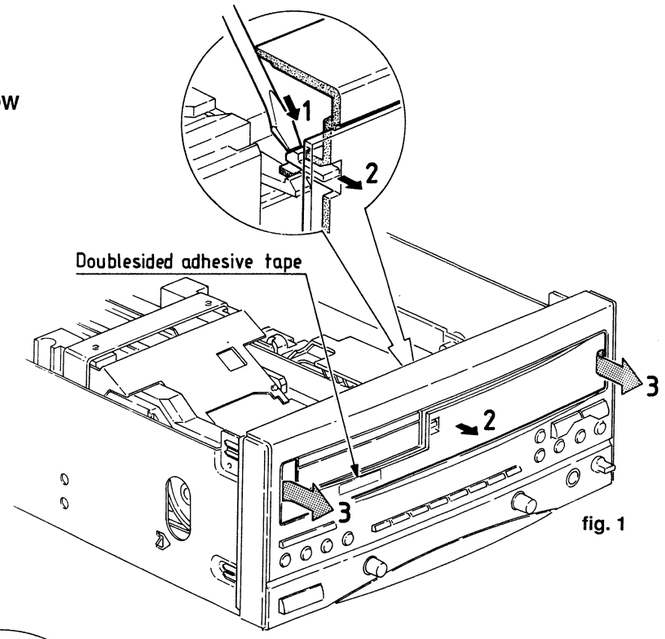


fig. 1

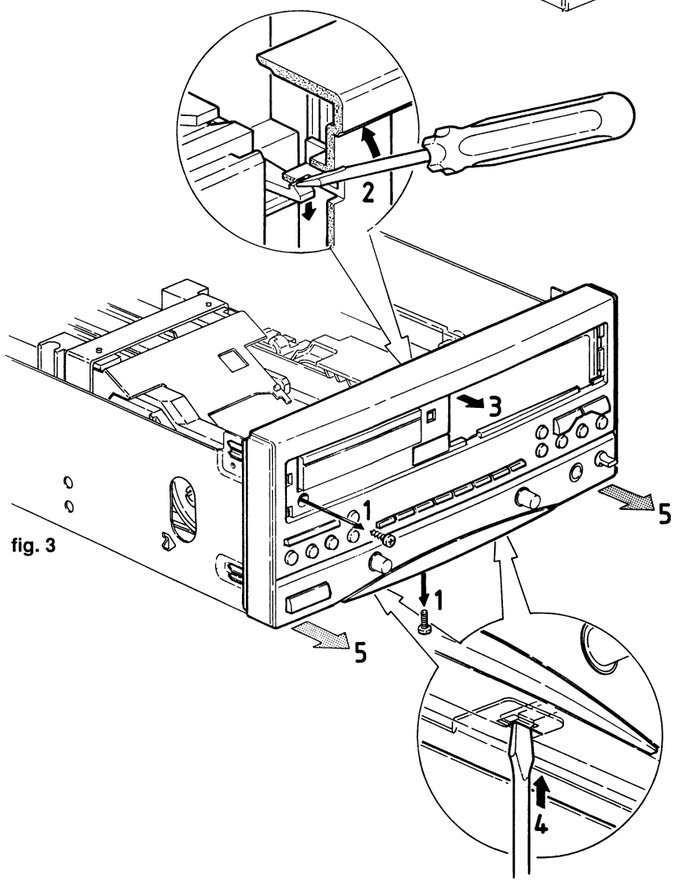


fig. 3

DISMANTLING OF FRONT
1. Remove front window as shown in fig. 1
2. Remove front drawer as shown in fig. 2
3. Loosen screws (1)
4. Release snap of loading assy (2)
5. Release front on top (3)
6. Release snaps of front (4)
7. Remove front as shown (5)

DISMANTLING OF FRONT DRAWER
1. Open tray as shown (1)
2. Release snaps (2)
3. Remove front drawer (3)

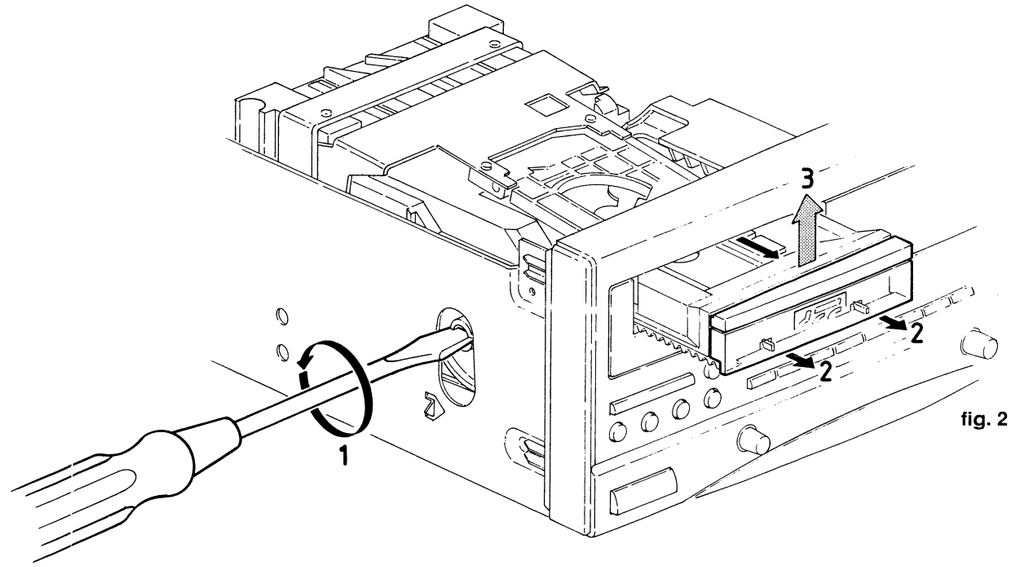


fig. 2

DISMANTLING OF LOADING ASSY (LDU1000)
1. Remove front window as shown in fig. 1
2. Remove front drawer as shown in fig. 2
3. Push tray inside (1)
4. Loosen screws (2)
5. Release snap and remove loading assy as shown (3)

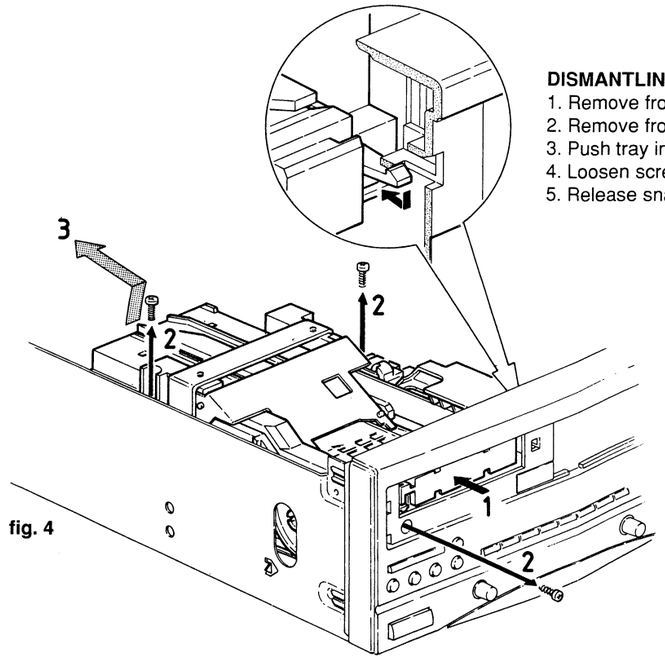


fig. 4

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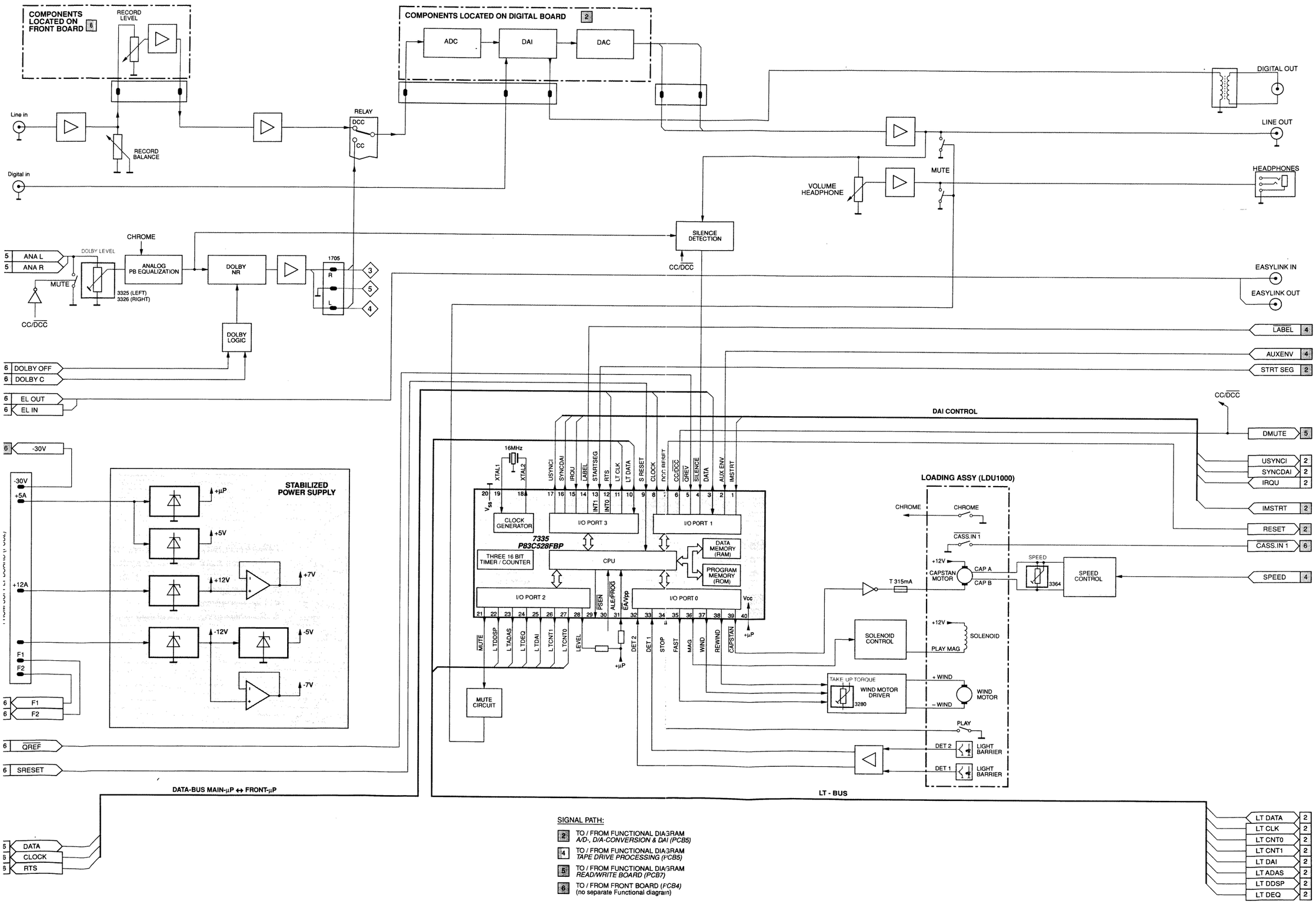
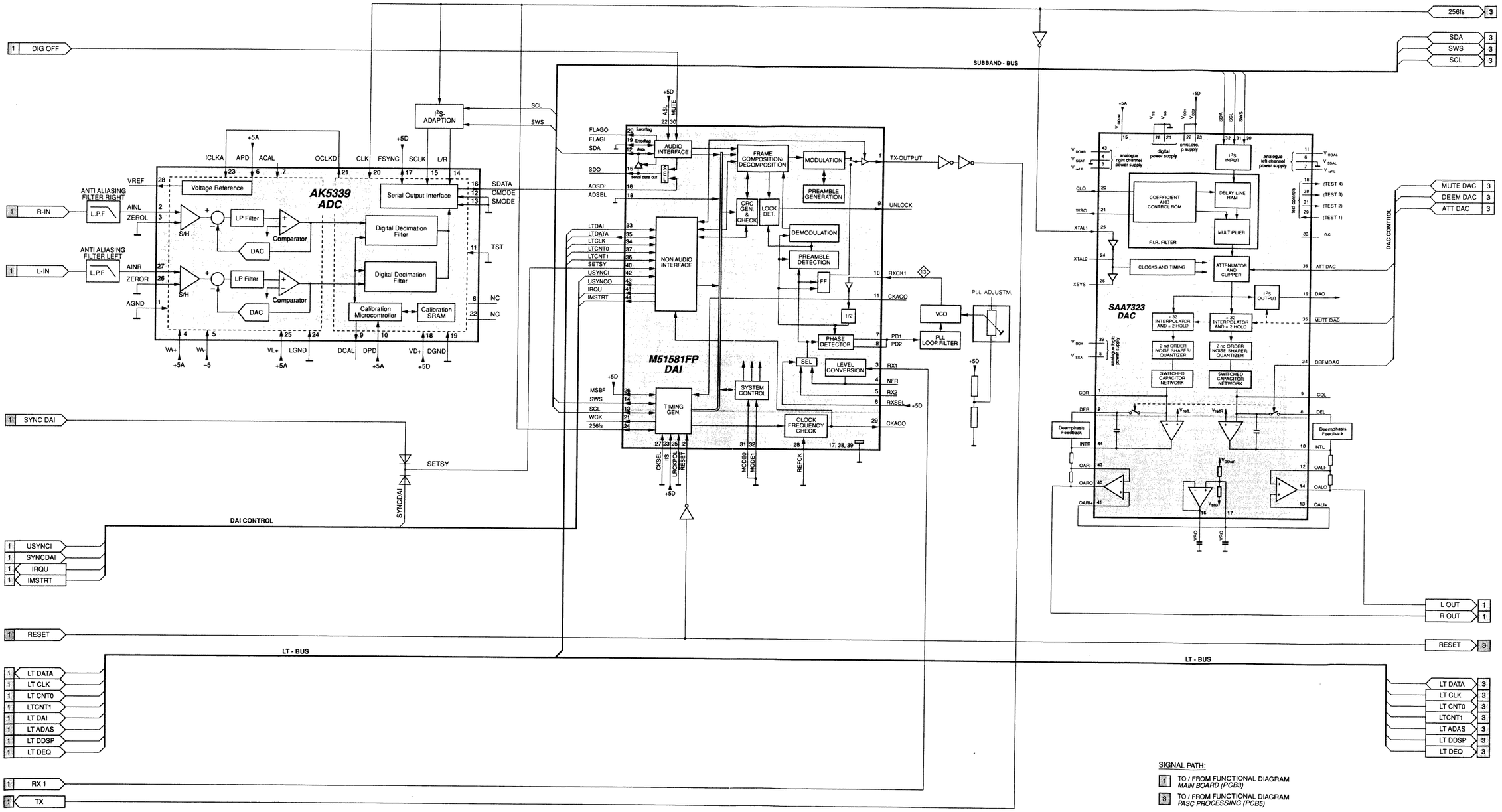
1 FUNCTIONAL DIAGRAM *MAIN BOARD (PCB3)*



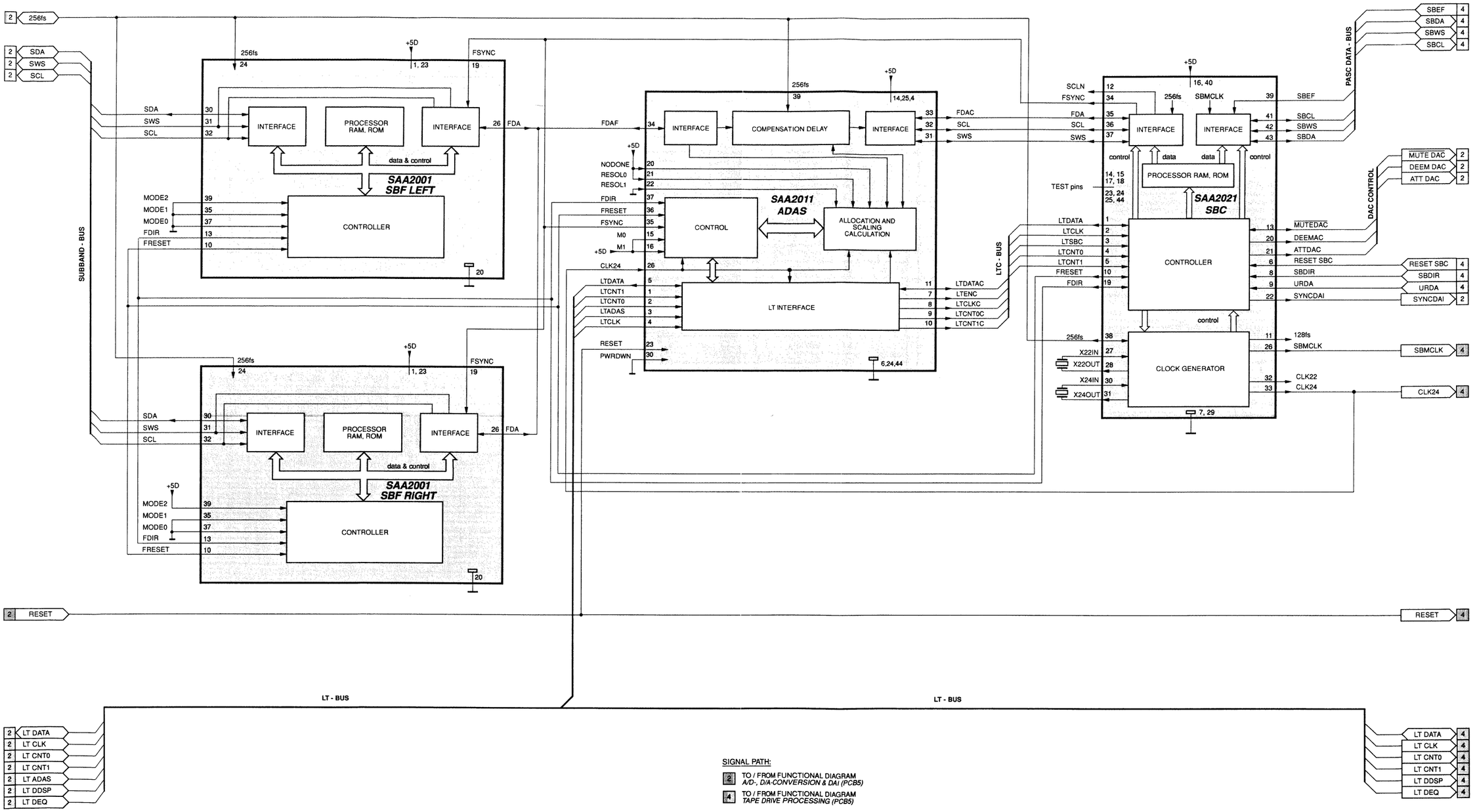
SIGNAL PATH:

- 2 TO / FROM FUNCTIONAL DIAGRAM *A/D-, D/A-CONVERSION & DAI (PCB5)*
- 4 TO / FROM FUNCTIONAL DIAGRAM *TAPE DRIVE PROCESSING (PCB5)*
- 5 TO / FROM FUNCTIONAL DIAGRAM *READ/WRITE BOARD (PCB7)*
- 6 TO / FROM FRONT BOARD (*PCB4*) (no separate Functional diagram)

2 FUNCTIONAL DIAGRAM *DIGITAL BOARD (PCB5) – A/D-, D/A-Conversion & DAI*



3 FUNCTIONAL DIAGRAM *DIGITAL BOARD (PCB5) – PASC PROCESSING*

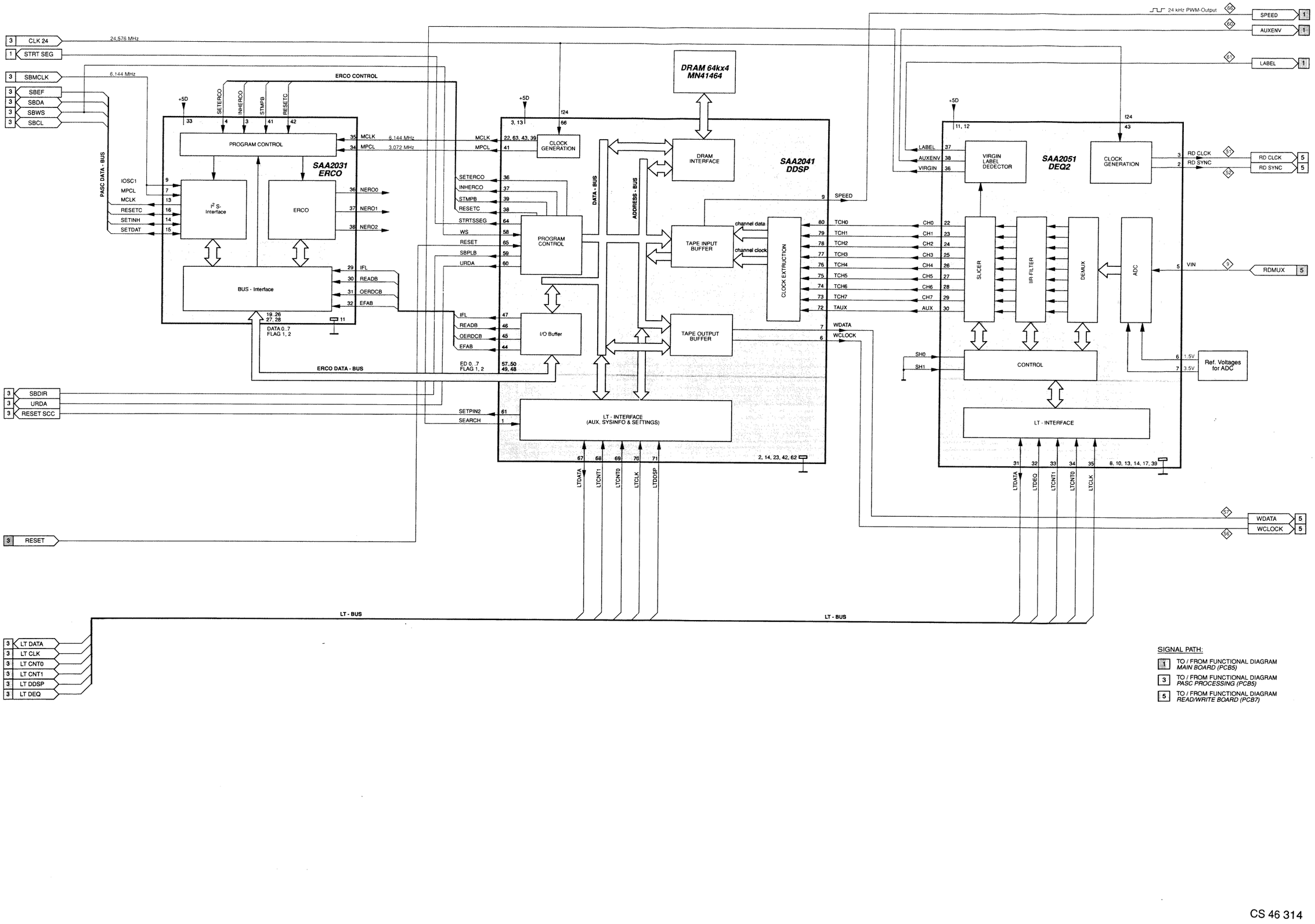


SIGNAL PATH:

2 TO / FROM FUNCTIONAL DIAGRAM *A/D-, D/A-CONVERSION & DAI (PCB5)*

4 TO / FROM FUNCTIONAL DIAGRAM *TAPE DRIVE PROCESSING (PCB5)*

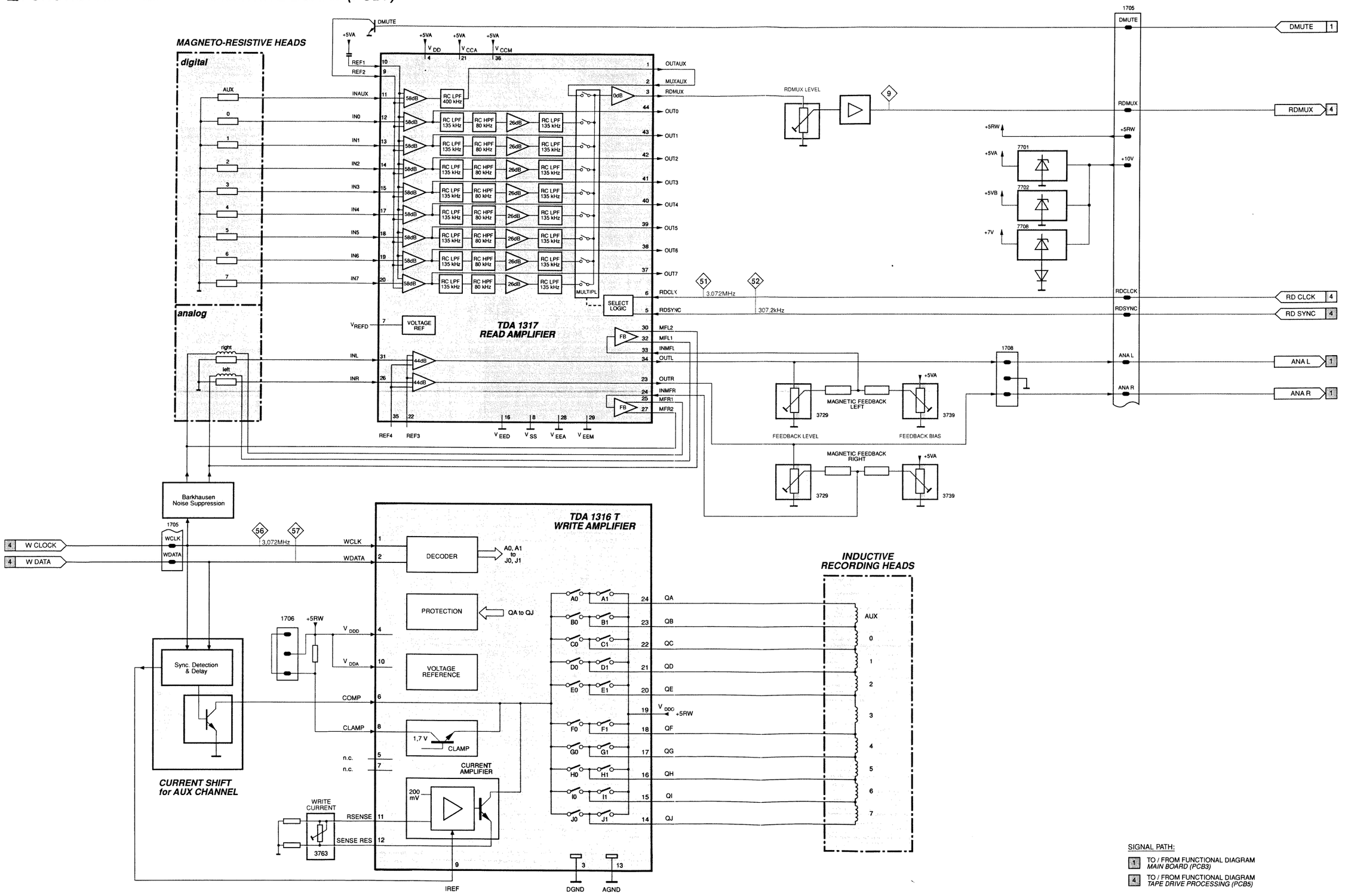
4 FUNCTIONAL DIAGRAM *DIGITAL BOARD (PCB5) – TAPE DRIVE PROCESSING*



SIGNAL PATH:

- 1 TO / FROM FUNCTIONAL DIAGRAM *MAIN BOARD (PCB5)*
- 3 TO / FROM FUNCTIONAL DIAGRAM *PASC PROCESSING (PCB5)*
- 5 TO / FROM FUNCTIONAL DIAGRAM *READ/WRITE BOARD (PCB7)*

5 FUNCTIONAL DIAGRAM *READ/WRITE BOARD (PCB7)*



SIGNAL PATH:

1 TO / FROM FUNCTIONAL DIAGRAM *MAIN BOARD (PCB3)*

4 TO / FROM FUNCTIONAL DIAGRAM *TAPE DRIVE PROCESSING (PCB5)*

Signal name	*Signal flow*	*Function*	*Explanation*
128Fs	SBC → n.c.	clock	Clock output from SBC, 128 x sampling frequency.
256Fs	SBC ↔ DAI SBC → SBF SBC → ADC SBC → DAC SBC → ADAS	system clock	Master clock signal (256 x sampling frequency) for SBF, DAI, ADC, DAC and ADAS. Is generated by SBC with exception of the mode Digital Record. In that case the DAI is the MASTER and supplies 256Fs on MSTCK pin. See also MSTCK. Fs=32 kHz for DAB, DSR or BS (digital audio broadcast). Fs = 44.1 kHz for CD and DCC. Fs=48 kHz for professional recording and DAT.
ADRS0 ADRS1 ADRS2 ADRS3 ADRS4 ADRS5 ADRS6 ADRS7	DDSP → DRAM	address lines	8 address lines to DRAM to locate an address for writing data into or read.
ADSDI	ADC → DAI	analog/digital serial data input	DAI input for serial data from AD convertor (see also SDATA).
ADSEL	DAI → gnd	control line	Serial data output source selection.
ANA L ANA R	read amp → analog Pb equalization	signal line	Analog signal left (right) channel playback analog compact cassette.
ASL	DAI → +5V	control line	Audio sample length selection.
ATT	SBC → DAC	attenuation	Data input for DAC to set his attenuation register.
ATTDAC	SBC → DAC	attenuate DAC	Control line (output from SBC) connected to DAC attenuation input.
AUX	DEQ → DDSP	auxiliary channel output	Sliced output from DEQ of auxiliary channel data routed to DDSP (bit rate 12 kb/s).
AUXENV	DEQ → Main µP	auxiliary envelope	Digital representation of the AUX signal and monitors during DCC search mode the start of a track.
AZCHK	DDSP → test pin	azimuth check	Monitors the azimuth of channels 0 and 7 (output of DDSP).
BIASA BIASD	DEQ → high DEQ → low	control line control line	Bias current for internal A/D converter of DEQ2 Bias current for internal A/D converter of DEQ2
CAP A CAP B	Capstan motor → speed control	control line	Via connection points A and B of capstan motor the reference of the integrated speed control is controlled by the additional external speed control.
CAPSTAN	Main µP → 7359	control line	Low output level switches the capstan motor on.
CASN	DDSP → DRAM	control line	Column address strobe for DRAM
CH0 CH1 CH2 CH3 CH4 CH5 CH6 CH7	DEQ → DDSP	channel n	DEQ channel n output to DDSP inputs TCH0...TCH7.
CHROME	RE-deck electronic → Analog Pb equalization	control line	Indication if a chrome analog cassette is inserted. Chrome Cassette is high level.
CKACO	DAI → n.c.	testpin	Frequency accuracy check output (1=frequency deviation > 0.14% = error condition)
CLAB	ERCO ↔ SBC	I^2S bit clock	Bit clock I/O from ERCO directly connected to SBC I/O SBCL pin (see also SBCL).
CLOCK	Main µP → Front µP	clock	Clock frequency for data transfer.

Signal name	*Signal flow*	*Function*	*Explanation*
CLK22	SBC → n.c.	22.5792 MHz clock	
CLK24	SBC → DDSP SBC → DEQ SBC → ADAS	24.576 MHz master clock	Master clock from SBC to DDSP, ADAS and DEQ to determine the length of tape frame and inter frame gap. In case of a digital recording this clock is not synchronous with the sampling frequency and its related frequencies, coming from the DAI (see also F24).
DAAB	ERCO ↔ SBC	serial data (I^2S)	Bidirectional I^2S serial data line between ERCO and SBC (see also SBDA).
DATA	Front µP ↔ Main µP	data line	Communication line Front µP – Main µP.
DATA0 DATA1 DATA2 DATA3 DATA4 DATA5 DATA6 DATA7	ERCO ↔ DDSP	data line n	Parallel data lines for symbol transfer between ERCO and DDSP. DDSP is the master. See also ED0 ... ED7.
DCC RESET	Main µP → ADAS Main µP → DAI Main µP → DDSP	control line	Reset output for Main µP for digital board.
DEEMDAC	SBC ↔ DAC	deemphasize DAC	Control line for DAC
DET1 DET2	sensor tape counter → Main and Front µP	Indication of reel movement	Indication of reel movement Signals enable the µP: – to detect if both reels move – tape end indication – source for tape counter – to calculate speed while WIND and REWIND – position of tape
DIGEYE	DEQ → test pin	digital eye output	Serial data output signal to obtain digital eye pattern to test equalization performance of the channels. See also VAL.
DIG OFF	MUTE circuit → DAI	control line	Mutes the DAI during switch on/off the set additional to the analog outputs.
DMUTE	Main µP → read amp	control line	Mutes the digital part of the read amplifier when playing analog cassettes.
EASY LINK EL in EL out	Easy link interface ↔ Front µP	Easy link bus	Easy link bus enables to control the set via another set (e.g. amplifier). Easy link command to/from internal µP to external set.
EL switch	easy link indication → Front µP	control line	Indication for Front µP if set is equipped with Easy link input.
ED0 ED1 ED2 ED3 ED4 ED5 ED6 ED7	DDSP ↔ ERCO	Erco data line	Bidirectional parallel databus between DDSP and ERCO. See also DATA0...DATA7.
EFAB	ERCO → SBC		Error flag I^2S error flag directly connected to SBC input SBEF to give the error status of bytes being transferred during data playback (see also SBEF).
F24	DDSP ← SBC DEQ ← SBC	24.576 MHz master clock	Master clock from SBC to DDSP and DEQ to determine the length of tape frame and inter frame gap. In case of a digital recording this clock is not synchron with the sampling frequency and its related frequencies, coming from the DAI (see also CLK24).
FAST	Main µP → wind motor driver	control line	High output level switches +12V supply to the motor bridge in order to obtain high speed.

Signal name	*Signal flow*	*Function*	*Explanation*
FDA	SBF ↔ ADAS SBC ↔ ADAS	filtered data	Bidirectional serial data line between SBF and ADAS respectively SBC and ADAS.
FDAC	ADAS ↔ SBC		Data transfer in I^2S format, carrying 32 sub–band channels digital audio data (see also FDAF and FDAC). Each SWS period 2x18 bits data are transferred.
FDAF	ADAS ↔ SBF	filtered data	Filtered data transfer between ADAS and SBC (see also FDA).
		filtered data	Filtered data transfer between ADAS and SBF (see also FDA).
FDIR	SBC → SBF SBC → ADAS	direction control	Control line output from SBC to SBF and ADAS to indicate the mode of operation. FDIR=1; decoding mode (sub–band synthesis) FDIR=0; encoding mode (sub–band analysis).
FLAG1 FLAG2	ERCO ↔ DDSP	data bus flag	Data lines for symbol transfers between ERCO and DDSP. DDSP acts as the master (see also ED8 and ED9).
FLAGI FLAGO	DAI → gnd DAI → n.c.	error flag error flag	Error flag input Error flag output
FRESET	SBC → SBF SBC → ADAS	filter reset	Reset output from SBC to cause a general reset for SBF and ADAS.
FSYNC	SBC → SBF SBC → ADAS	filter synchronization	At filter sync, with a repetition rate of Fs/32, the transfer of the 2x32 sub–band samples is started. Fsync ensures each SBF is synchronized with the SBC to permit only transfer of sub-band 0 data during FSYNC.
HRESET	mute circuit → Front µP	control line	Switches Front µP on/off. Via mute circuit there is detected if the set is switched on or off. Via the HRESET line the front µP gets this info
ICLAMP	write amp → 1706	output line	Write current output
IFL	DDSP → ERCO	imposed flag	During the ERCO encoding mode the IFL line from DDSP is used to force the symbol currently transferred to the ERCO to become a parity symbol during ERCO encoding.
IIS	DAI → +5V	control line	I^2S Bus format selection (1=I^2S Bus, 0=non I^2S Bus format)
IMSTART	DAI → Main µP	information message start	Control line from DAI to main µP to indicate the start of a message transfer.
IN0 IN1 IN2 IN3 IN4 IN5 IN6 IN7	Head → read amp	data lines	Head signals of main data channels 0–7
INAUX	Head → read amp	data line	Head signal of auxiliary data.
INHERCO	DDSP → ERCO	inhibit ERCO	Control line output of DDSP to inhibit the ERCO for settings transfer. These settings determine whether the ERCO should encode or decode (see also SETINH).
INL	Head → read amp	analog data line	Analog input signals from DCC head
INMFL	read amp →	feedback line	Magnetic feedback amplifier input left
INMFR	read amp →	feedback line	Magnetic feedback amplifier input right
INR	Head → read amp	analog data line	Analog input signals from DCC head
INTL	DAC → L–ch	integrator left	Analog output of the DAC (outputs from the left positive and negative switched–capacitor integrator) to the left channel amplifier stage.

Signal name	*Signal flow*	*Function*	*Explanation*
INTR	DAC → R–ch	integrator right	Analog output of the DAC (outputs from the right positive and negative switched–capacitor integrator) to the right channel amplifier stage.
IOSC1	ERCO ← SBC	input oscillator	Oscillator input for ERCO coming from the sub–band coder SBMCLK output. The nominal frequency is 6.144 MHz. See also SBMCLK.
IRQU	DAI → µP	information request microprocessor	Control line to indicate the main microprocessor information can be read.
I^2S–bus		inter IC sound	3–line serial bus consisting of a line for two time–multiplexed audio data channels, a word select line for indication of the channel being transmitted (left or right) and a clock line. The lines are called SD, WS and SCK. The device which generates the SCK and WS is the master. See also SCK, SWS and SDA.
L–IN	Relay 1307 → ADC	signal line	Analog signal input left channel for ADC from recording amplifier or dolby IC selected by relay 1307.
L–OUT	DAC → line out amp	signal line	Analog signal output left channel of DAC.
LABEL	DEQ → µP	label	Search mode label detection output of DEQ signals that a label is found in the AUX–channel. When DCC player is in search mode, the tape speed increases. LABEL information is encoded throughout its length. To examine the length of a label, the tape speed must be known. In search mode DEQ assesses the speed of labelled tapes. The microprocessor obtains this information via the LT–interface.
LEVEL	Main µP → silence detection	control line	Control signal to adapt the silence detection circuit to the tape speed. (High speed during search, Normal speed in Rec mode.)
L/R	ADC ←	L/R clock input	Word clock input for the ADC
LRCKPOL	DAI → gnd	control line	polarity of LRCK selection
LT–Bus	µP ↔ ADAS µP ↔ DAI µP ↔ DDSP µP ↔ DEQ		LT–interface is used for the system control of the digital panel. The LT–interface consists of clock–, data–, control– and enable lines.
LTC–Bus LTCLKC LTCNT0C LTCNT1C LTDATAC LTSBC	ADAS ↔ SBC		LTC–interface is mainly used for transfer of allocation information from ADAS to SBC (Encoding mode). The LTC–interface consists of clock–, data–, control– and enable lines.
LTCLK	µP → DAI µP → ADAS µP → DEQ µP → DDSP	LT–clock	Bit clock line for the LT–interface. Main microprocessor supplies the bit clock and acts as master whilst the other devices perform as slaves.
LTCLKC		LTC–clock	Bit clock line for the LTC–interface. ADAS supplies the bit clock and acts as master, the SBC performs as slave.
LTCNT0 LTCNT1	µP → DAI µP → ADAS µP → DEQ µP → DDSP	LT control lines	Control lines of the LT–interface output from main microprocessor. LTCNTn determine the type of transfer to occur across the LTDATA serial data line to/from microprocessor.
LTDATA	µP ↔ ADAS µP ↔ DAI µP ↔ DDSP µP ↔ DEQ	LT data	Bidirectional serial data line of the LT–interface from/to microprocessor. Direction of data transfer depends on the information on LTCNT0 and LTCNT1.
LTEN LT–ADAS	µP → ADAS	LT enable ADAS	Activates the LT–interface of the ADAS in case LTENA =1.

Signal name	*Signal flow*	*Function*	*Explanation*
LTEN LT–DAI	µP → DAI	LT enable DAI	Activates the LT–interface of the DAI in case LTEN (on DAI) =1.
LTEN LT–DDSP	µP → DDSP	LT enable DDSP	Activates the LT–interface of the DDSP in case LTEN (on DDSP) =1.
LTENDEQ LT–DEQ	µP → DEQ	LT enable DEQ	Activates the LT–interface of the DEQ in case LTENDEQ =1.
MAG	Main µP → solenoid control circuit	control line	Low output pulse switches the solenoid.
MCLK	DDSP → ERCO	master clock	MCLK line of the DDSP provides the 6.144 MHz master clock signal and is connected to the MCLK input of the ERCO. This clock (128 x Fs) is used for the symbols transfer between DDSP and ERCO.
MFL1 MFL2	read amp ← head		feedback amplifier output left
MFR1 MFR2	read amp ← head		feedback amplifier output right
MODE0 MODE1	DAI ← gnd	mode selection input	Control lines from to select the operation mode of the DAI. DAI operates in µP mode when both lines are at '0' level.
MPCL	DDSP → ERCO	clock phase reference	The MPCL output of the DDSP provides the 3.072 MHz (64 x Fs) clock phase reference signal which is connected to the MPCL input of the ERCO.
MSBF	DAI → +5V	control line	1 = **M**ost **S**ignificant **B**it **F**irst 0 = Least Significant Bit First
MSTCK	DAI ↔ 256Fs	master clock	Bidirectional master clock line. Dependant on CKSEL settings the master clock is at 128Fs or 256Fs. See also 256Fs.
MUTE1	DAI ← µP	mute audio	Control line from microprocessor to mute the digital audio interface. The audio output of the DAI is kept zero when the PLL is not locked in the reception mode (see also UNLOCK).
MUTE	Main µP → mute circuit	control line	Control line from the main µP to mute the audio and headphone output.
	DAC ← SBC	mute	Input line. See also MUTEDAC.
MUTEDAC	SBC → DAC	mute DAC	Control line output of SBC for muting the D/A convertor.
MUXAUX	read amp →	data line	Multiplexer input for auxiliary data.
NER0 NER1 NER2	ERCO → test connector	number of erasures	The NERx outputs produce an indication of the number of erasures encountered in the code word currently being processed.
NFR	DAI → DAI	ext. resistor	Output of level converter.
NODONE	ADAS → +5V	control line	NODONE state selection input.
OERDCB	DDSP → ERCO	output enable for ERCO	Indication for the ERCO to output data on the data bus lines (DATA1...DATA7, FLAG1 and FLAG2).
OUT0 OUT1 OUT2 OUT3 OUT4 OUT5 OUT6 OUT7 OUTAUX	read amp → n.c.	output	Parallel output of read IC.
OUTL OUTR	read amp →	output line	Analog output of read IC.

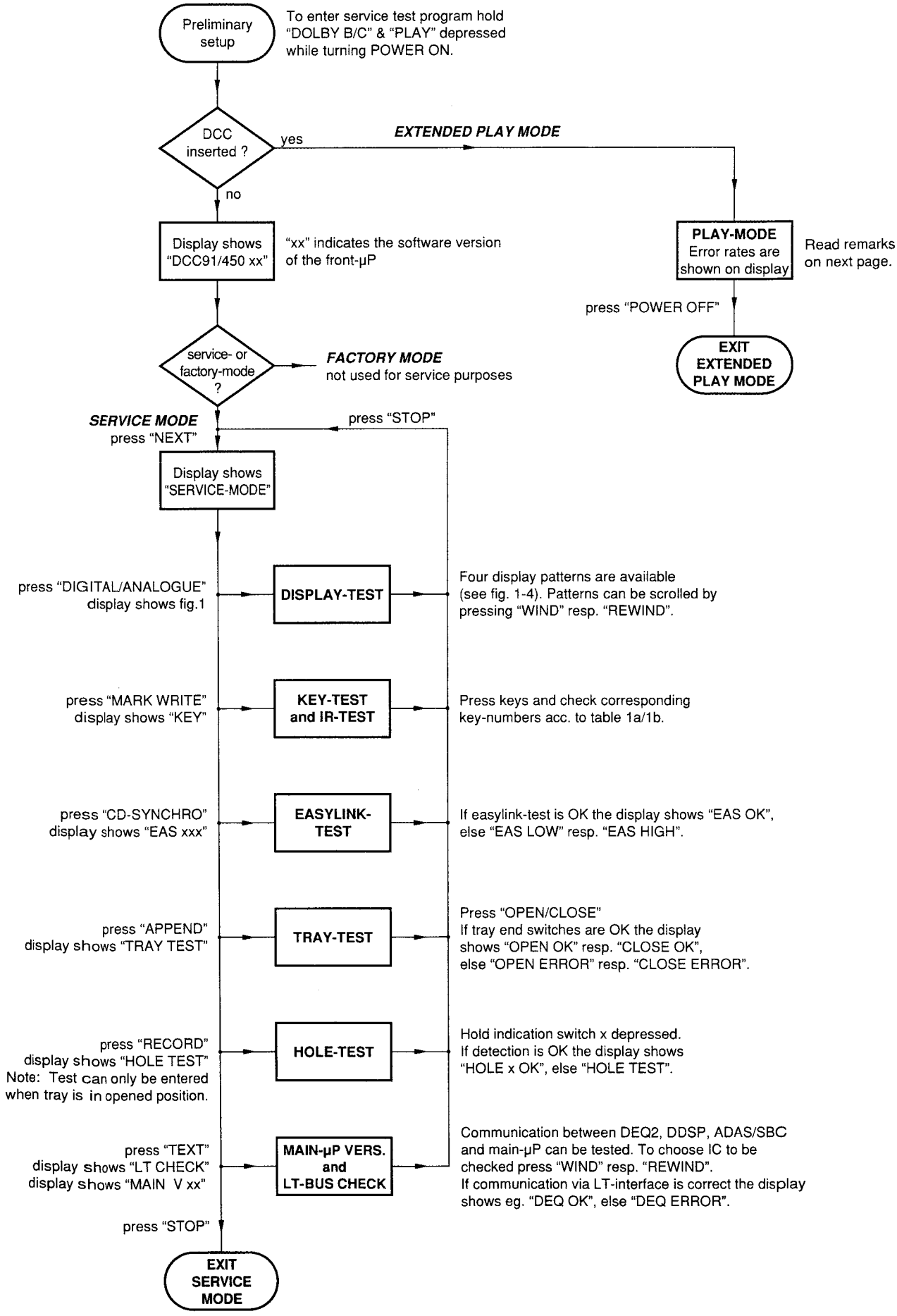
Signal name	*Signal flow*	*Function*	*Explanation*
PD1 PD2	DAI → VCO	phase detector	Phase detector output from DAI for the charge pump of the VCO. The VCO locks to incoming frequencies on digital input. When locked the DAI supplies the 256Fs master clock.
PLAY MAG	Solenoid control → RE Deck electronic	control line	Connection to the solenoid on the RE deck. Low pulse is solenoid on.
PRGSTAT	DDSP → n.c.	program status	DDSP program status output.
PWRDWN	ADAS → gnd	control line	Power down input.
QA QB QC QD QE QF QG QH QI QJ	write amp → head	data line	Signal for write heads
QU. REV	tape end sensor → quick reverse detection → Main µP	control line	At tape end of a digital compact cassette the reflecting foil causes a HIGH pulse out of the light barrier. The quick reverse detection circuit works as a Schmitt trigger in order to suppress disturbances. The output pulse controls the main µP. If a valid pulse is detected the main µP switches the tap transport to reverse operation immediately in order to overjump the non magnetic transparent leader tape of the cassette.
R–IN	Relay 1307 → ADC	signal line	Analog signal input right channel for ADC from recording amplifier or dolby IC selected by relay 1307.
R–OUT	DAC → line out amp	signal line	Analog signal output right channel of DAC.
RASN	DDSP → DRAM	row address strobe negative	row address strobe for DRAM.
RDATA0 RDATA1 RDATA2 RDATA3	DDSP ↔ DRAM	RAM data bus	Bidirectional data bus between DDSP and DRAM. On DRAM IC these lines are called DQ1...DQ4.
RDCLCK	DEQ → read amp	read clock	Data clock (3.072 MHz) for the read amplifier. The data of 8 data channels and 1 aux channel is transferred during 10 RDCLK periods.
RDMUX	read amp → DEQ	read multiplex	Read multiplexer output from read amplifier to DEQ. See also VIN.
RDSYNC	DEQ → read amp	read synchronization	Control output of DEQ to read amplifier to synchronize the read amplifier multiplexer and the DEQ demultiplexer.
READB	DDSP → ERCO	read enable	Read enable for ERCO. When active the ERCO reads data from DDSP on data bus ED0...ED9.
REF1 REF2 REF3 REF4	read amp ←	reference	Reference voltage input of read amplifier.
REFCK	DAI ← gnd	clock input	Reference clock for frequency accuracy check (normal 9.408 MHz). Not used in our set.
REFN REFP	DEQ ←	reference	Lower reference voltage for internal ADC. Upper reference voltage for internal ADC
RESET	Main µP → ADAS Main µP → DDSP Main µP → DAI	control line	Reset.
RESETC	DDSP → ERCO	reset erco	Control output from DDSP to ERCO to reset ERCO.

Signal name	*Signal flow*	*Function*	*Explanation*
RESOL0 RESOL1	ADAS ← +5V ADAS ← gnd	control line	Resolution selection. 10 = 18 bit selected
REWIND	Main µP → wind motor driver	control line	Control signal to switch the driver bridge of the wind motor to the desired function. High output level is rewind mode.
ROEN	DDSP → DRAM	output enable	Output enable for DRAM.
RTS	Main µP ← Front µP	control line	Request to send
RSENSE	write amp ←	sense line	feedback voltage
RX1	DAI ← COAX in	receive data	IEC format digital audio data input for coaxial input. (min 200mVpp)
RX2	DAI ← OPT in	receive data	IEC format digital audio data input for optical input. (logical CMOS levels)
RXCKI	DAI ← VCO	receive clock input	Input for VCO frequency (256Fs).
RXCKO	DAI → VCO	receive clock output	Output for VCO frequency (256Fs).
RXSEL	DAI ← +5V	receiving mode selection	Selection between reception inputs RX1 and RX2. (1 = RX1)
SBCL	SBC ↔ ERCO	sub–band clock	SBCL line is part of the S(ub)–B(and)–I²S interface and provides the bit clock. See also CLAB.
SBDA	SBC ↔ ERCO	sub–band data	Sub–band I²S interface line for serial data transfer between SBC and ERCO.
SBDIR	SBC ← DDSP	sub–band direction	Control line from DDSP to SBC to indicate the direction of the data flow between ERCO and SBC on SBDA line. See also SBPLB.
SBEF	SBC ← ERCO	sub band error flag	I²S error flag to give the error status of bytes being transferred during data playback to the SBC (see also EFAB).
SBMCLK	SBC → ERCO	sub–band master clock	Master clock (6.144 MHz) for ERCO (see also IOSC)
SBPLB	DDSP → SBC	sub–band direction	Control line from DDSP to SBC to indicate the direction of the data flow between ERCO and SBC on SBDA line. See also SBDIR.
SBWS	SBC ↔ ERCO SBC → DDSP	sub–band word select	The SBWS signal indicates the channel of the sample (either left or right) and is equal to the sampling frequency Fs. On the ERCO and DDSP devices the signal is called WS (see also WS).
SCL	SBC → SBF SBC → ADAS SBC ↔ DAI DAI → I²S adaption of ADC	serial clock	Bit clock for the I²S–interface. Clock frequency is 64x sampling frequency. See also BCKI and SCLK.
SDO	DAI → n.c.	serial data output	Serial data output for digital audio data bus.
SDA	DAI ↔ SBF DAI → DAC ADC → DAI	serial data	Serial data line of I²S–bus. The data line carries digital audio (broad band data) according I²S–format. Two samples (left– and right channel) are transferred during one SWS–period. The ADC outputs broad band data via its SDATA pin, the DAI receives data on its ADSDI pin and outputs data on SDA, the DAC on SDI1 and SDI2.
SDATA	ADC → DAI	serial data	Serial data output of AD convertor which is transferred to DAI data input ADSDI (see also ADSDI).
SEARCH	DDSP ← DEQ	control line	search level detection input

Signal name	*Signal flow*	*Function*	*Explanation*
SELERFI	DDSP → ERCO	select ERCO/FIFO	Control line output of DDSP to determine the nature of data transferred to ERCO. If SELERFI=1 the transfers are to and from the error correction section. If SELERFI=0 transfers are to and from I^2S–interface section of the ERCO device.
SENSRES			
SETDAT	ERCO ← DDSP	settings data register	Data settings line for the settings register of the ERCO. SETDAT determines the operational mode of the ERCO device. See also SETERCO.
SETERCO	DDSP → ERCO	set ERCO	Output of DDSP to transfer control settings of the ERCO (see also SETDAT). These settings determine whether ERCO should encode or decode and it also designates the direction of data transfer for the I^2S–interface.
SETINH	ERCO ← DDSP	settings inhibit	When SETINH is active the ERCO can receive settings data (via SETDAT line) from DDSP for its operation mode (see also INHERCO, SETDAT and SETERCO).
SETPIN1 SETPIN2	DDSP →	control line	Port expander output pins of DDSP. See also RESET SBC
SETSY	DAI ← SBC	settings sync	DAI latches new settings in internal register when SETSY is active. SETSY is sent by SBC which takes care for external clock source synchronization (see also SYNCDAI).
SILENCE	silence detection → Main µP	control line	Indication for main µP that pause has been detected.
SH0 SH1	DEQ ← gnd	control line	Selection of desired 8bit window of internal ADC of DEQ2.
SPEED	DDSP → speed control circuit	speed control	Pulse width modulated control output of DDSP for phase regulating the speed of the capstan in the tape deck (tape speed).
SRESET	Front µP → Main µP	reset	Software reset.
STARTSEG	DDSP → µP	start segment	STARTSEG indicates the start of a new segment. The STARTSEG output from the DDSP is used as a timing reference for transfer of SYSINFO and AUX information between the microprocessor and the DDSP.
STBY	Front µP → power supply	control line	Switches +5V power supply off and subsequently +12V, –12V and –5V.
STMPB	DDSP → ERCO	start error correction program	STMPB initiates the execution of the error correction program, to begin processing a new code word and causes activation of the new settings for both I^2S–interface and the ERCO.
STOP	RE Deck electronic → Main µP	control line	Indicates if the head support is in play or stop position. Stop position is high level
SWS	SBC → ADAS SBC → SBF SBC ↔ DAI SBC → I^2S Adaptor	word select	Word select line (at sampling frequency) for I^2S interface. SBC acts as the master with the exception of the mode digital recording. In that case DAI is the master.
SYNCDAI	SBC → DAI	synchronize DAI	With SYNCDAI (identical with SETSY) the settings for the DAI are latched. These settings are transferred via the LT–bus.
TCH0 TCH1 TCH2 TCH3 TCH4 TCH5 TCH6 TCH7 TAUX	DDSP ← DEQ	channel input	Parallel input lines of DDSP receiving sliced (digital) information of DEQ (see also AUX and CH0...CH7).
TX	DAI → digital out	transmit data	Digital data output of DAI according IEC format.

Signal name	*Signal flow*	*Function*	*Explanation*
UNLOCK	DAI → n.c.	unlock VCO	UNLOCK indicates that VCO frequency is locked/unlocked to received data.
URDA	DDSP → SBC	unreliable data	Only during playback URDA indicates that, regardless of all other flag information, all main data, system information or AUX data is unusable. URDA occurs during a mode change from data recording to playback or if the DDSP must re–synchronize with the tape signals.
USYNCI	DAI ← µP	sync input	Indicates the start of a new data frame when in transparent mode.
USYNCO	DAI →	sync output	Indicates start of a new data frame when in reception mode.y
VAL	DEQ → test pin	validation data	Validation signal output for data bits. To test equalization performance it is possible to output the equalized channels. The DEQ has for this purpose two digital outputs present: DIGEYE and VAL (see also DIGEYE).
VIN	DEQ ← read amp	voltage input	DEQ inputs via VIN time multiplexed data from read amplifier. See also RDMUX.
VIRGIN	DEQ → DDSP	virgin detection	Control output of DEQ to inform the microprocessor if a blank tape is inserted. See also SEARCH.
WCLCK	write amp ← DDSP	write clock	Clock signal for the write amplifier as timing referencey
WCLOCK	DDSP → write amp	write clock	Write clock for write amplifier coming from DDSP. See also WCLK.
WDATA	DDSP → write amp	write data	Serial data signal of the 8 main channels and AUX channel, directed to the write amplifier.
WIND	Main µP → wind motor driver	control line	Control signal to switch the driver bridge of the wind motor to the desired function. High level in FastForward and in Play mode.
+WIND –WIND	Wind motor driver → wind motor	supply line	Connection to terminal of wind motor.
WRN	DDSP → DRAM	write enable	Write enable of the DRAM.
WS	ERCO ↔ SBC DDSP ← SBC	word select	I^2S–interface word selection I/O line. Is connected to SBWS pin of SBC. See also SBWS.
X22IN X22OUT	SBC ← SBC →	crystal input crystal output	22.5792 MHz
X24IN X24OUT	SBC ← SBC →	crystal input crystal output	24.576 MHz
XTAL1 XTAL2	DAC ← 256Fs DAC → n.c.		
XSYS	DAC → n.c.		Buffered output from crystal oscillator.

SERVICE TEST PROGRAM - FLOW CHART


Preliminary setup
To enter service test program hold "DOLBY B/C" & "PLAY" depressed while turning POWER ON.
DCC inserted ?
yes
EXTENDED PLAY MODE
no
Display shows "DCC91/450 xx"
"xx" indicates the software version of the front-µP
PLAY-MODE Error rates are shown on display
Read remarks on next page.
press "POWER OFF"
EXIT EXTENDED PLAY MODE
service- or factory-mode ?
FACTORY MODE
not used for service purposes
SERVICE MODE
press "NEXT"
press "STOP"
Display shows "SERVICE-MODE"
press "DIGITAL/ANALOGUE"
display shows fig.1
DISPLAY-TEST
Four display patterns are available (see fig. 1-4). Patterns can be scrolled by pressing "WIND" resp. "REWIND".
press "MARK WRITE"
display shows "KEY"
KEY-TEST and IR-TEST
Press keys and check corresponding key-numbers acc. to table 1a/1b.
press "CD-SYNCHRO"
display shows "EAS xxx"
EASYLINK-TEST
If easylink-test is OK the display shows "EAS OK", else "EAS LOW" resp. "EAS HIGH".
press "APPEND"
display shows "TRAY TEST"
TRAY-TEST
Press "OPEN/CLOSE"
If tray end switches are OK the display shows "OPEN OK" resp. "CLOSE OK", else "OPEN ERROR" resp. "CLOSE ERROR".
press "RECORD"
display shows "HOLE TEST"
Note: Test can only be entered when tray is in opened position.
HOLE-TEST
Hold indication switch x depressed.
If detection is OK the display shows "HOLE x OK", else "HOLE TEST".
press "TEXT"
display shows "LT CHECK"
display shows "MAIN V xx"
MAIN-µP VERS. and LT-BUS CHECK
Communication between DEQ2, DDSP, ADAS/SBC and main-µP can be tested. To choose IC to be checked press "WIND" resp. "REWIND".
If communication via LT-interface is correct the display shows eg. "DEQ OK", else "DEQ ERROR".
press "STOP"
EXIT SERVICE MODE

SERVICE TEST PROGRAM – DESCRIPTIONS

1. GENERAL

The test program is equipped with a service mode, a factory mode and an extended playback-mode.
- The service mode includes tests for display, detection of hole switches and keys.
- The factory mode is a special test program, which is used in the production process of the front board, but not useful for service purposes.
- In the extended playback-mode the error rates (C1 error flags from DDSP) are shown on the display. Also the tape channel for the digital eye output of the DEQ2 (pin1) can be selected.

2. EXTENDED PLAYMODE

- Insert a DCC
- Turn POWER OFF
- Hold DOLBY B/C & PLAY buttons depressed while turning POWER ON.

The set is now in the extended playmode, music will be audible. The C1-error flags, detected by the ERCO, are read out via the LT-interface of the DDSP.

- The display shows "x yy zz ffff".
  "x" indicates the selected tape channel
  "yy" indicates the error rate of channel (x-1) in %.
  "zz" indicates the error rate of channel x in %.
  "ffff" counts the number of tape blocks received without C1-error flags. The counter will be resetted with every C1-error.

Because of software reasons the error rate per channel can only be indicated in steps of 5%. In normal operating sets and excellent tape material the error rates will (due to the rough resolution) always be "0".
A much better indication for the quality of data gives the tape block counter ("ffff"). If the count is resetted just every minute the signal processing path should be OK. In case of too high error rates (frequent resets) check the signalflow DCC head → read amplifier → DEQ → DDSP (especially RDMUX).

- Press the TIME button to increase x by steps of 2.
  Remark: After pressing 4x the TIME button the display shows "eeeeeeee fffff". This pattern is not useful for service purposes.

- To exit the extended playmode press the STOP button.

3. SERVICE MODE

- Remove cassette from the cassette compartment.
- Hold DOLBY B/C & PLAY depressed while turning POWER ON.
- The display shows "DCC91/450 xx".
  "xx" indicates the software version of the front-µP.
- To enter servicemode1 press the NEXT button.
- The display shows "SERVICE MODE".

The available tests can now be entered by pressing the corresponding buttons (see also flow chart, page 31).

- To exit the service mode press the STOP button.

3.1. DISPLAY TEST

- To enter the display test start service test program and press the DIGITAL/ANALOGUE button.
- The display shows fig. 1.

Four display test pattern are available (see fig. 1-4). The patterns can be scrolled forwards resp. backwards by pressing the WIND- resp. REWIND button.

- To exit the display test press the STOP button.

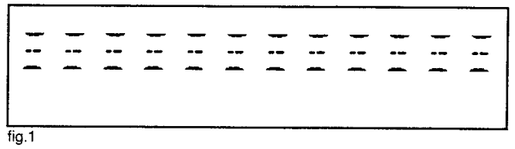


fig.1

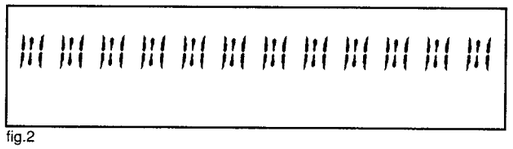


fig.2

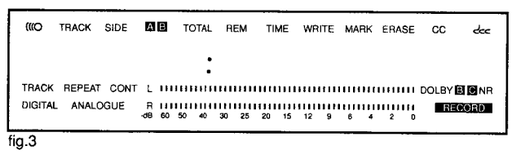


fig.3

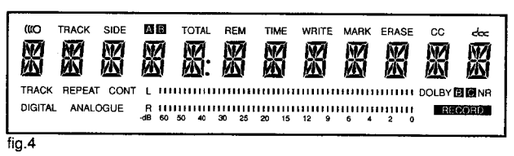


fig.4

3.2. KEY- and IR-TEST

- To enter the key test start service test program and press the MARK WRITE button.
- The display shows "KEY".

Press keys and check their corresponding key-numbers acc. to table 1a resp. table 1b.

KEY	KEY NUMBER	KEY	KEY NUMBER
WRITE MARK	29	SCROLL SPEED	33
DIGITAL/ANAL.	2A	STOP	*exit keytest*
SIDE A/B	2B	PLAY	36
TEXT	2C	REPEAT	37
OPEN/CLOSE	2D	PREVIOUS	39
WIND	2E	NEXT	3A
REWIND	2F	DOLBY B/C	3B
TIME	30	RESET	3C
ERASE MARK	31	RECORD/PAUSE	3D
RENUMBER	32	RECORD/MUTE	3E
CD SYNCHRO	33	APPEND	3F

table 1a

IR-CONTROL KEY	KEY NUMBER	KEY	KEY NUMBER
START MARK	29R	PREVIOUS	39R
SIDE A/B	2BR	NEXT	3AR
TEXT	2CR	RESET	3CR
OPEN/CLOSE	2DR	APPEND	3FR
WIND	2ER	STAND BY	41R
REWIND	2FR	DCC SELECT	42R
TIME	30R	NUM: 0..9	43R
STOP	*exit keytest*	RECORD/MUTE	46R
PLAY	36R	RECORD	47R
REPEAT	37R		

table 1b

- To exit the key test press the STOP button.

3.3. EASYLINK TEST

- To enter the easylink test start service test program and press the CD-SYNCHRO button.
- The display shows "EAS xxxx".

If the easylink interface is OK the display shows "EAS OK", else "EAS LOW" resp. "EAS HIGH".

- To exit the easylink test press the STOP button.

3.4. TRAY TEST

The tray test is mainly intended to check the end stop switches 1436/1437, located on the tray indication board (PCB 0, page 65).
- To enter the tray test start service test program and press the APPEND button.
- The display shows "TRAY TEST".

If tray end stop switches are OK the display shows "OPEN OK" resp. "CLOSE OK", else "OPEN ERROR" resp. "CLOSE ERROR".

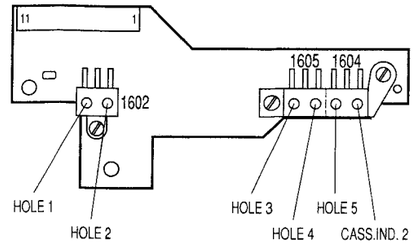
- To exit the tray test press the STOP button.

3.5. HOLE TEST

Note: The hole test can only be entered when the tray is in opened position. To move tray outside execute tray test, first.

- To enter the hole test start service test program and press the RECORD button.
- The display shows "HOLE TEST". Hold indication switch x depressed and check display.

DCC-INDICATION BOARD (PCB 6)



If detection of holes is OK the display shows e.g. "HOLE 1 OK", else "HOLE TEST".

- To exit the hole test press the STOP button.

3.6. MAIN-µP VERSION AND LT-BUS CHECK

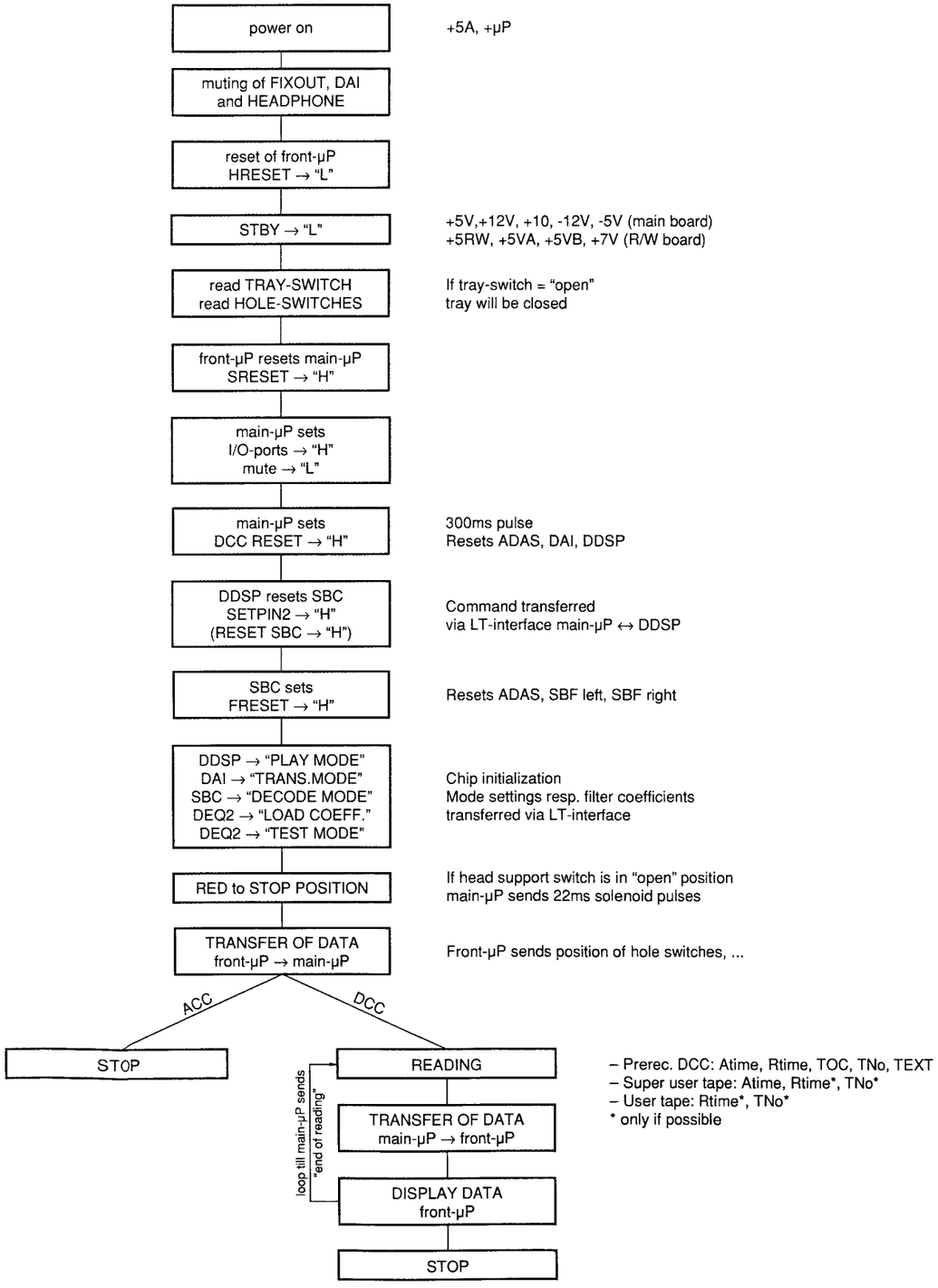
This test displays the software version of the main-µP and checks the communication between DEQ2, DDSP, ADAS/SBC and main-µP. The test program sends settings via the LT-Bus to the selected IC, and checks if these settings have been received / can be read out correctly.

- To enter the LT-bus check start service test program and press the TEXT-button.
- The display shows "LT-CHECK" for approx. 1 sec.
- The display shows "MAIN Vxx" for approx. 1 sec.
  "xx" indicates the software version of the main-µP.
- Next the DEQ is checked automatically, the result is shown on the display.

If the communication via LT-interface is correct the display shows "DEQ OK", else "DEQ ERROR".

- To test the communication to the other ICs press the WIND resp. REWIND button.
- To exit the LT-bus check press the STOP button.

START-UP PROCEDURE


power on
+5A, +µP
muting of FIXOUT, DAI and HEADPHONE
reset of front-µP HRESET → "L"
STBY → "L"
+5V,+12V, +10, -12V, -5V (main board)
+5RW, +5VA, +5VB, +7V (R/W board)
read TRAY-SWITCH read HOLE-SWITCHES
If tray-switch = "open" tray will be closed
front-µP resets main-µP SRESET → "H"
main-µP sets I/O-ports → "H" mute → "L"
main-µP sets DCC RESET → "H"
300ms pulse
Resets ADAS, DAI, DDSP
DDSP resets SBC SETPIN2 → "H" (RESET SBC → "H")
Command transferred via LT-interface main-µP ↔ DDSP
SBC sets FRESET → "H"
Resets ADAS, SBF left, SBF right
DDSP → "PLAY MODE" DAI → "TRANS.MODE" SBC → "DECODE MODE" DEQ2 → "LOAD COEFF." DEQ2 → "TEST MODE"
Chip initialization
Mode settings resp. filter coefficients transferred via LT-interface
RED to STOP POSITION
If head support switch is in "open" position main-µP sends 22ms solenoid pulses
TRANSFER OF DATA front-µP → main-µP
Front-µP sends position of hole switches, ...
ACC
DCC
STOP
READING
loop till main-µP sends "end of reading*
TRANSFER OF DATA main-µP → front-µP
DISPLAY DATA front-µP
STOP
– Prerec. DCC: Atime, Rtime, TOC, TNo, TEXT
– Super user tape: Atime, Rtime*, TNo*
– User tape: Rtime*, TNo*
* only if possible

ADJUSTMENT TABLE

	REMARKS	◇	C		
TAPE SPEED					
Use test cassette "SBC420" 3150Hz (4822 397 30071)		◇1 ◇2 main board	3264	Use f-counter, adjust to f = 3150Hz ±10Hz	
TAKE UP TORQUE					
Use tourque measurem. cass. "811CTM" (4822 395 30054)		main board	3280	Adjust to 40..50g-cm	
WOW AND FLUTTER					
Use test cassette "SBC420" 3150Hz (4822 397 30071)		◇1 ◇2 main board	check only	< 0,15% wtd.	
ANALOG FEEDBACK LEVEL AND BIAS					
Use test cassette "SBC420" 1kHz -10dB (4822 397 30071)	Set feedback pots 3729(left) and 3730(right) to max. output level first	◇6 ◇7 ◇8 read/write board	3739 (left) 3740 (right)	Adjust both channels to min. THD (target <2%)	
		◇6 ◇7 ◇8 read/write board	3729 (left) 3730 (right)	Decrease measured output level by 10dB	
DOLBY LEVEL					
Use Dolby reference cassette	Dolby ref. level 200nWb/m	◇3 ◇4 ◇5 main board	3325 (left) 3326 (right)	Adjust both channels to 615mV ±30mV Check: level meter shows -6dB	
PLL-FREQUENCY					
	Disconnect cable from digital-in plug, switch DCC-set to RECORD PAUSE (digital source)	◇13 ◇58 digital board	3550	Use f-counter, adjust to 7,25MHz +0,15/-0MHz	

SERVICE REMARKS

DCC-head

The heads used in the DCC-system are called "thin film head" and made by repeating 20 times or more of multiple evaporations and spatterings as in fabricating ICs.
Accordingly, the heads have different features and characteristics from those of coil winding type heads used in conventional analog cassette tape decks:

- The playback head uses a magnetic resistive element (MRH)
- The MRH needs magnetic bias to obtain its maximum output. So, a bias conductor which is equivalent to a coil to develop the magnetic bias is installed.
- Moreover, the analog playback head needs a magnetic feedback to increase linearity. This is realized by giving a magnetic field proportional to the MR-element output from a bias conductor.

For terminals and structure of the DCC-head see page 57, circuit diagram read/write board.

Handling DCC-heads

Caution: The heads are susceptible to electrostatic voltage higher than 150VDC. The heads are protected from external electrostatic charging by connecting the head flexible cables to the read/write board. When disconnecting the cables, always place the deck on a bench with required electrostatic discharging measures taken and wear an electrostatic discharging band. Moreover, always mount the short-clip on the flexible cables removed.

The heads are also susceptible to strong external magnetic field and the analog output may be affected. Do not use a head demagnetizer, etc.

WARNING
DO NOT USE A DEMAGNETIZER CASSETTE !

Adjustment remark - recording current

For each head, a recommended recording current exists individually (120..180mA). If this value is not adjusted correctly, the RDMUX value does not match between a self recorded tape and prerecorded tape. Moreover, if a recording is made at a deep layer with a high value, the previous records can not be erased when an overwrite recording is made at that area later. As a consequence the error rate will be increased at that area.

The adjustment of the recording current requires an accuracy of ±0,2dB – a very close tolerance which can not be realized without special adjustment jigs.

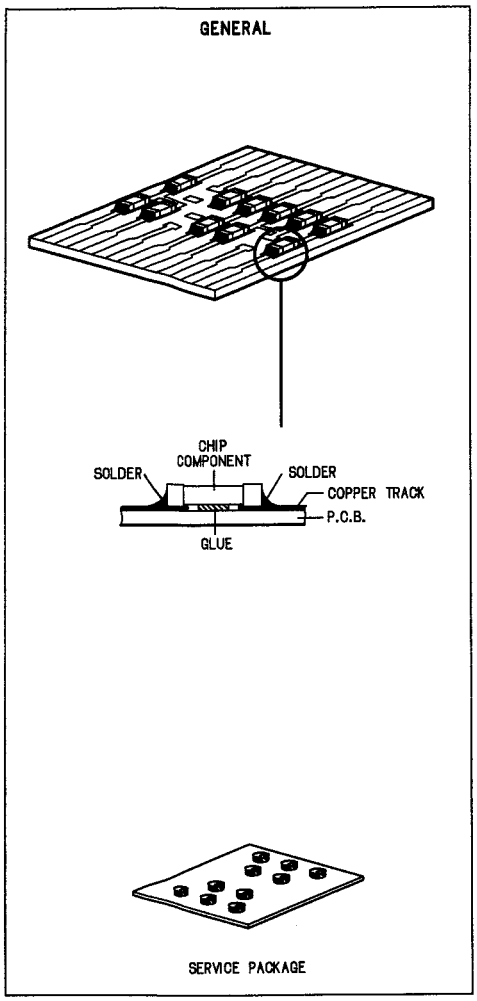
Therefore: When DCC-head or write-amplifier has to be replaced exchange the whole LDU1000 (loading-assy 4822 691 20833).

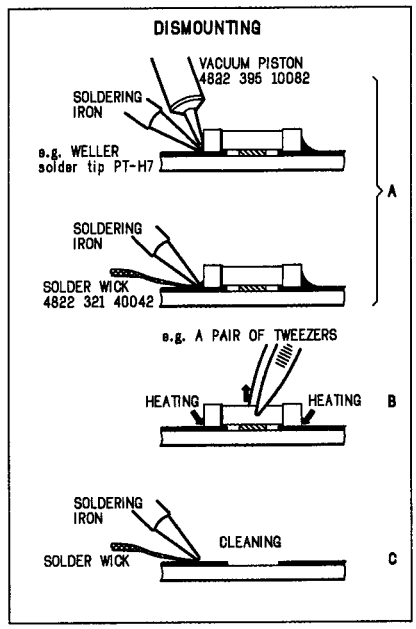
IMPORTANT NOTE:
The loading assy, delivered, is adjusted by the factory. Only adjustments which have to be carried out on the main board have to be done in the repair shop (tape speed, take-up torque, dolby level).
In coarse of production the temperature stability of the speed control has been improved:
On the DCC-indication board (PCB6) a NTC has been replaced by a diode/resistor section. As this modification influences the control range of the speed control the main board has to be matched to the LDU1000, delivered:
When replacing the built-in loading assy by versions with production stage LDU1000/WT00 or /WT01 change resistor 3263 from 15k to 12k (4822 051 20123) !

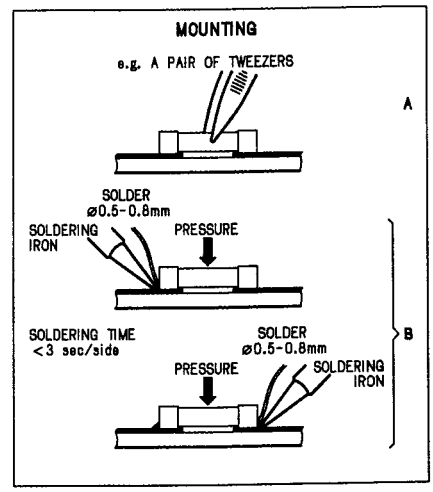
SERVICE TOOLS

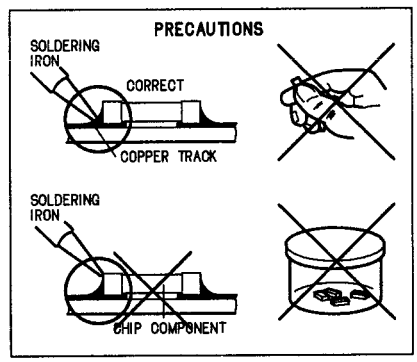
TORX screwdriver set "SBC163"	4822 395 50145
Universal analog **test cassette CrO_2** "SBC419"	4822 397 30069
Universal analog **test cassette Fe** "SBC420"	4822 397 30071
Torque measurement cassette "811CTM"	4822 395 30054
Also available:	
9,6kHz calibration cassette (prerecorded DCC)	4822 397 30264
Audio performance test cassette (prerecorded DCC)	4822 397 30255
General purpose test cassette (prerecorded DCC)	4822 397 30256
Tape guide gauge "ABEX THG-801"	4822 310 50108
Head mounting support	4822 403 70846

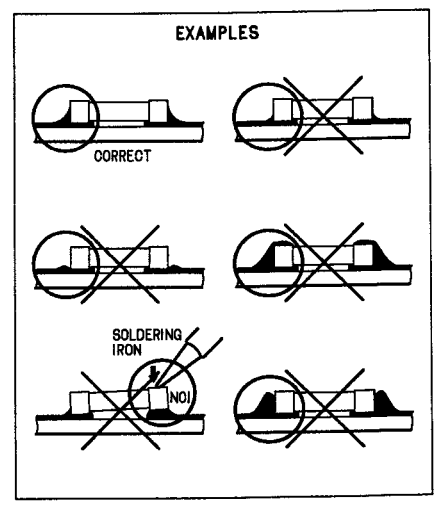
HANDLING CHIP COMPONENTS



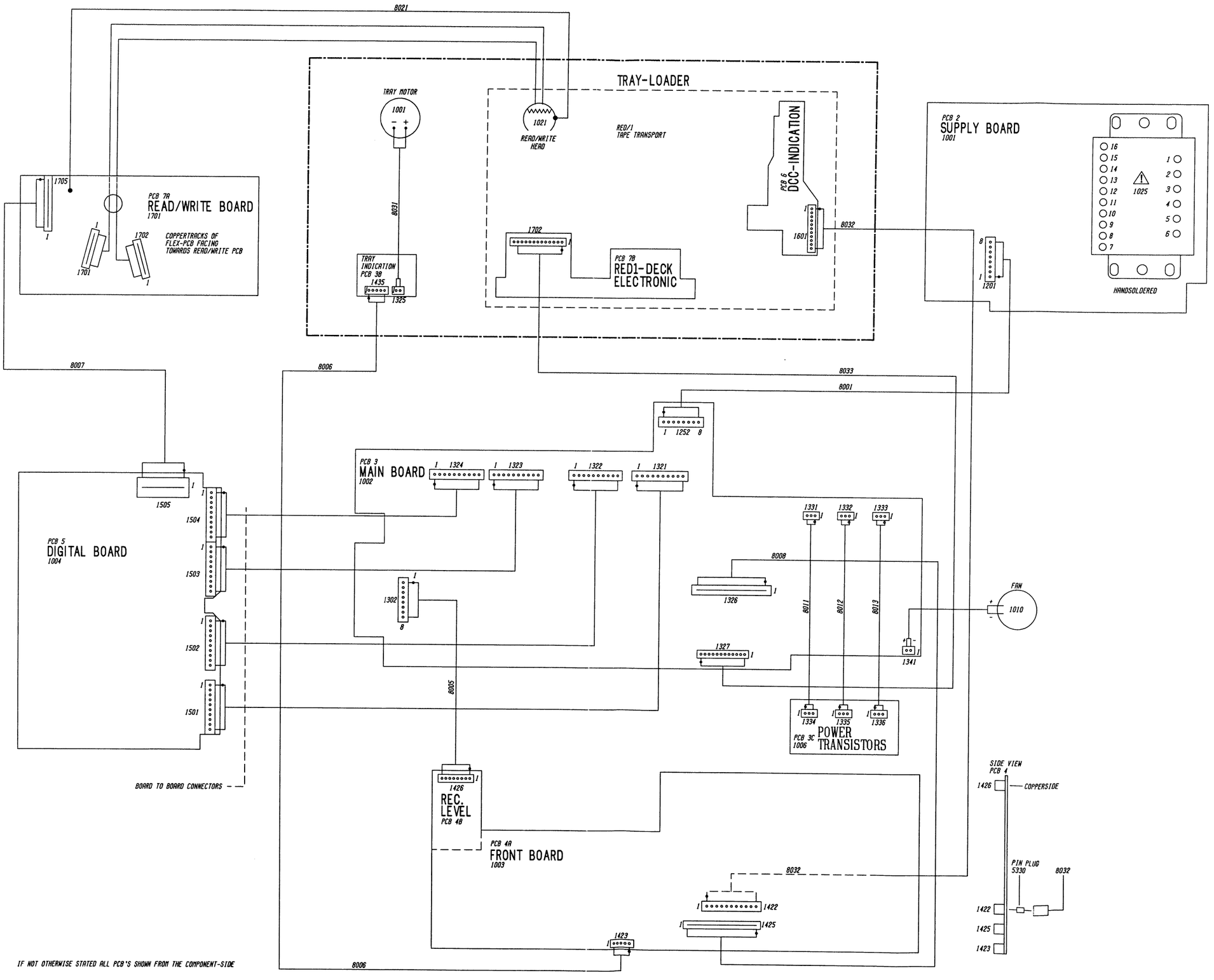




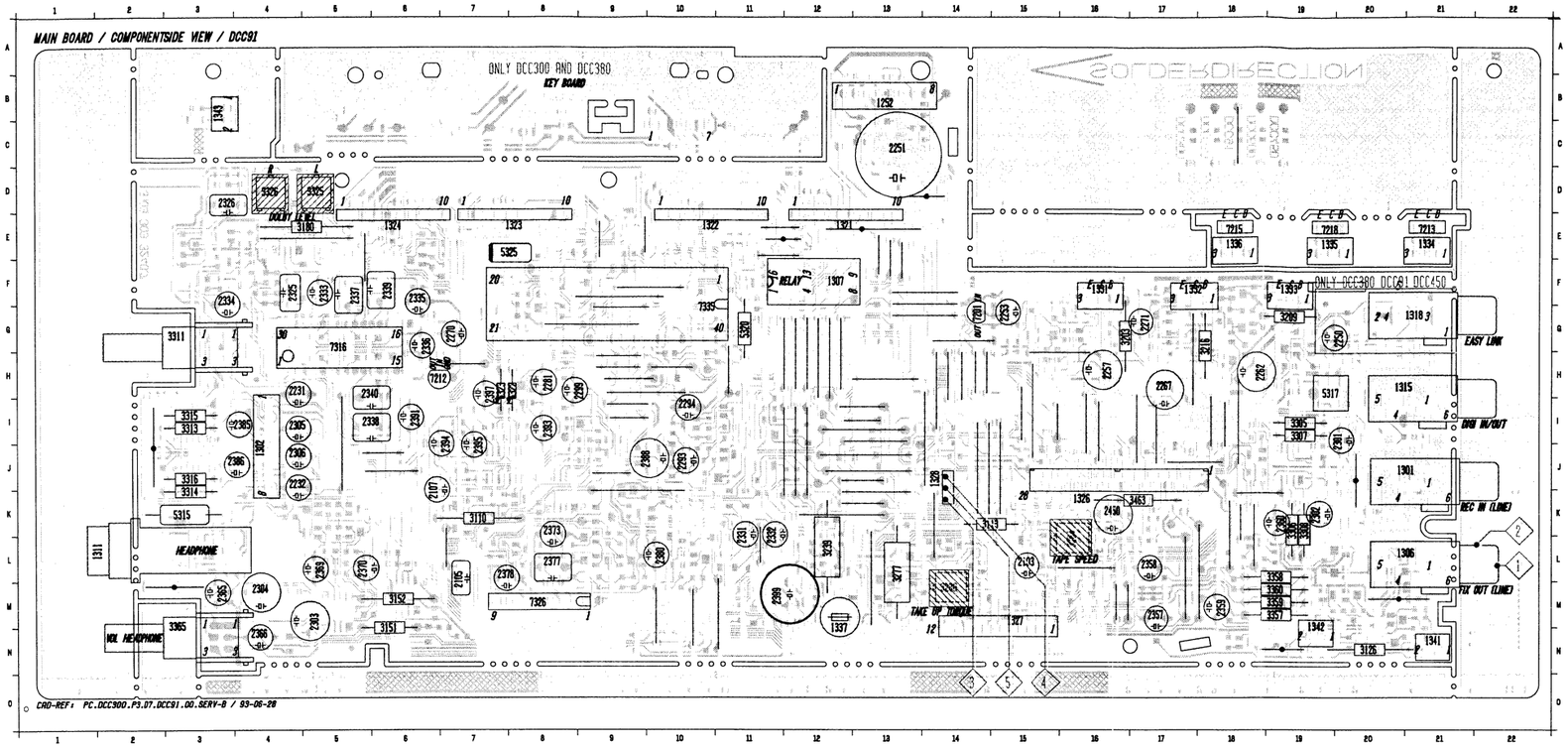




WIRING DIAGRAM



MAIN BOARD / COMPONENTSIDE VIEW / DCC91



1252	B13	3113	K15	2101	E15	2374	D9
1301	J21	3126	N20	2102	E15	2375	D10
1302	J4	3151	M6	2104	D15	2376	D8
1306	L21	3152	M6	2106	F7	2379	D10
1307	F12	3180	E5	2108	D16	2381	D10
1311	L2	3203	G16	2241	E8	2383	I21
1315	H20	3209	G19	2242	C7	2384	H19
1318	G21	3216	G18	2247	F21	2387	I10
1321	E12	3239	L12	2248	E20	2390	D7
1322	E10	3264	L16	2249	I21	2392	F7
1323	E8	3277	L13	2252	J15	2394	H7
1324	E6	3280	M14	2254	J15	2398	D8
1326	K16	3305	I19	2255	I15	3101	F7
1327	M15	3306	K19	2256	J16	3102	E7
1328	J14	3307	I19	2259	J19	3103	E15
1331	F16	3308	K19	2260	H18	3104	D15
1332	F17	3311	Q3	2261	I18	3105	C16
1333	F19	3313	I3	2264	J17	3106	E16
1334	E21	3314	K3	2265	H18	3107	E16
1335	E18	3315	I3	2266	I17	3108	C19
1336	E18	3316	J3	2268	I7	3109	E15
1337	M12	3325	D5	2269	I7	3111	D16
1341	N21	3326	D4	2272	I16	3112	D15
1342	M19	3357	M19	2273	J18	3114	E18
1343	B3	3358	L19	2275	D13	3115	C19
2103	L15	3359	M19	2276	L13	3118	C21
2105	L7	3360	D19	2277	N13	3117	C21
2107	K6	3365	M3	2278	N13	3118	C21
2231	H4	3463	K17	2279	N13	3119	C20
2232	J4	5315	K3	2280	N13	3120	I20
2250	G20	5317	M19	2283	N13	3121	I21
2251	C13	5320	D11	2284	G15	3122	I20
2253	G15	5325	E8	2285	J9	3123	N3
2257	M16	6322	H8	2286	G21	3124	N3
2262	H18	6323	H7	2287	J3	3125	J8
2267	M17	7201	G14	2288	K3	3127	C19
2270	D7	7212	M6	2289	C15	3128	D19
2271	G17	7213	E21	2290	C15	3129	D17
2281	H8	7215	E18	2291	D5	3130	G18
2293	J10	7218	E19	2292	C5	3132	G18
2294	I10	7316	G5	2296	G9	3133	D18
2299	H9	7326	M8	2298	F8	3134	D18
2301	I20	7335	G10	2300	D8	3135	C19
2302	K19			2307	J8	3136	D19
2303	M5			2308	J8	3137	M4
2304	M4			2309	J3	3138	L4
2305	I4			2310	K3	3139	E18
2306	J4			2311	E19	3140	D14
2325	F4			2312	G18	3141	G14
2326	D3			2313	G4	3142	G14
2331	K11			2314	G3	3143	G14
2332	K11			2315	G19	3144	F14
2333	F5			2316	F19	3145	G15
2334	F3			2317	G19	3146	F14
2335	F6			2318	F19	3147	K4
2336	G6			2319	G3	3148	K3
2337	F5			2320	F3	3153	K4
2338	I6			2321	L5	3154	J3
2339	F6			2322	N4	3155	H7
2340	H5			2323	K4	3156	G8
2357	M17			2324	N4	3157	H8
2358	L17			2327	J4	3158	G8
2359	M18			2328	N4	3159	Q7
2360	K19			2329	K4	3162	J9
2365	M3			2330	K3	3163	J10
2366	M4			2341	C17	3164	K11
2369	L5			2342	D17	3165	K11
2370	L5			2343	J6	3166	K11
2373	K8			2344	I6	3167	D11
2377	L6			2345	I5	3168	F12
2378	L7			2349	D20	3169	Q3
2380	L10			2350	D20	3170	Q4
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						7366	C13
						7367	D13
						7368	E14
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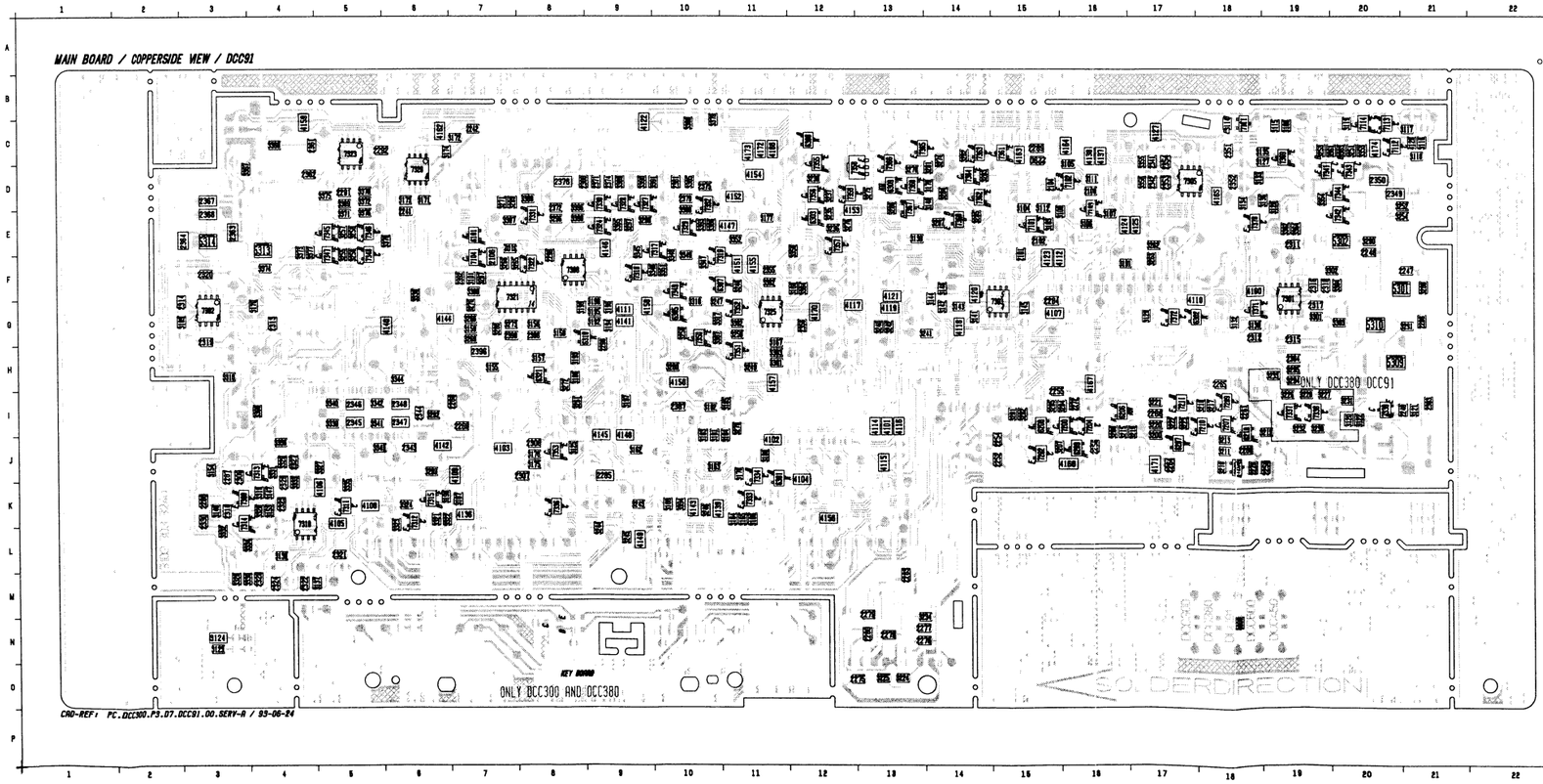
						7370	E18
						7371	D18
						7372	D17

MAIN BOARD / COPPERSIDE VIEW / DCC91



MAIN BOARD (PCB3)

ANALOG PLAYBACK EQUALIZATION

REC-PRE-AMPLIFIER

REC AMPLIFIER

REC BALANCE

LINE OUT AMP

AMPL. ADAPTION CC

AMPL. ADAPTION DAB

MUTE ANALOG PART

DOLBY

DOLBY LOGIC

SILENCE DETECTION

QUICK REVERSE DETECTION

MUTE CIRCUIT

SWITCH ON/OFF MUTE

RESET FRONT µP

EASY LINK INTERFACE

HEADPHONE AMP

VOLUME HEADPHONE

BOARD TO BOARD CONNECTORS TO DIGITAL BOARD

SOLENOID CONTROL

TACHIMETRIC SPEED-REGULATION

SPEED CONTROL

SIGNAL PATH

ANALOG PB

ANALOG PB, DIGITAL PB, MONITOR SIGNAL REC

REC ANALOG IN

REC DIGITAL IN

CURRENT PATH PB SIDE A

DC VOLTAGES MEASURED

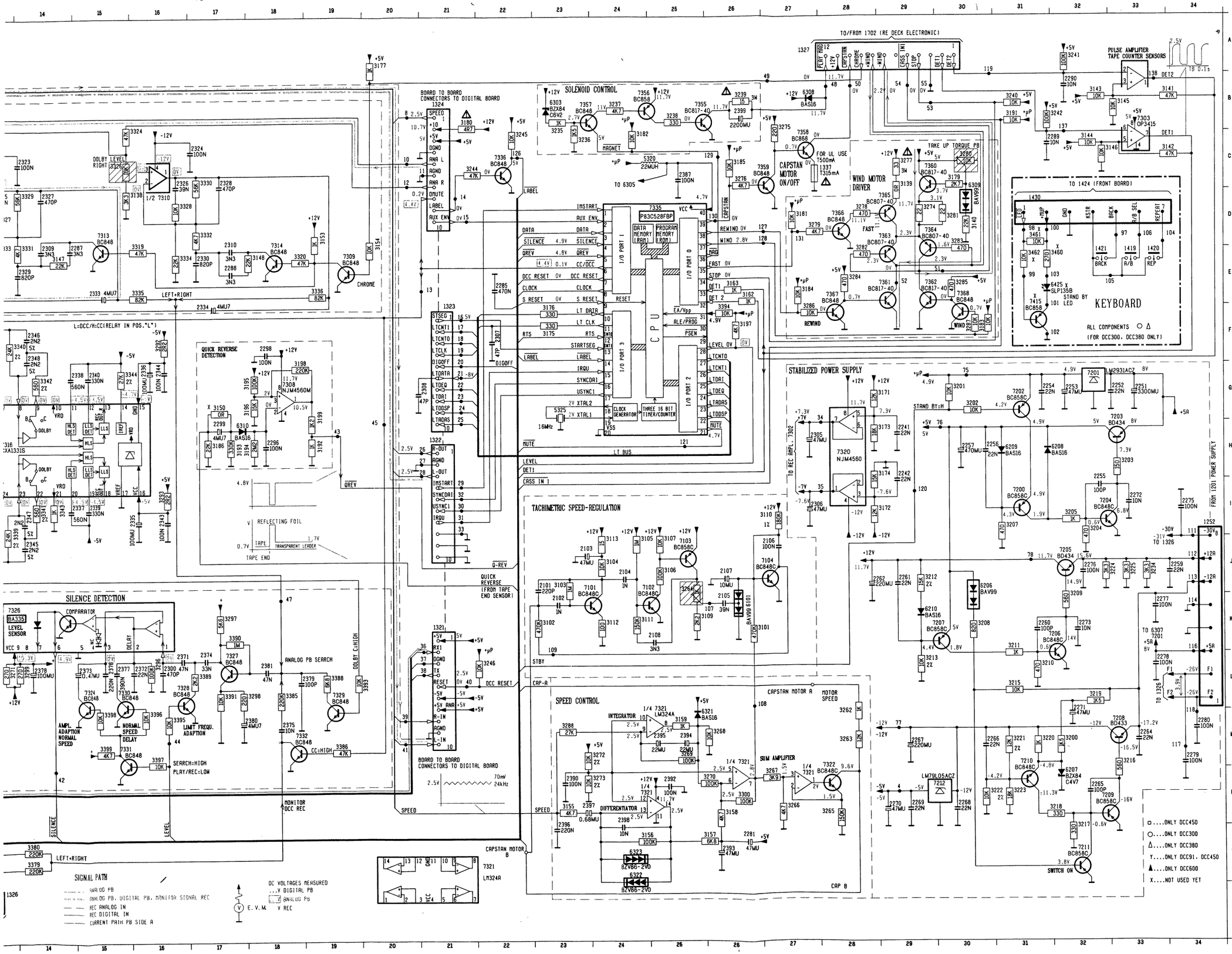
...V DIGITAL PB

...V ANALOG PB

V REC

E.V.M.

TO FROM 1425 (FRONT BOARD)



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1301	C 1	2349	E 2	3183	F30	3314	C 8	7204	I32
1302	A 5	2350	F 2	3184	E27	3315	C 8	7205	J32
1306	F 1	2351	D 5	3185	C26	3316	D 8	7206	K32
1307	B 9	2352	F 5	3186	H17	3317	J 2	7207	K30
1311	I 1	2353	D 5	3187	E11	3318	K 4	7208	M33
1315	M 1	2354	F 6	3188	F10	3319	D16	7209	N32
1318	O 1	2355	I10	3189	F11	3320	E18	7210	M31
1321	K21	2356	H10	3190	E11	3321	C11	7211	O32
1322	H21	2357	D 7	3191	B31	3322	C11	7212	N29
1323	E21	2358	E 7	3192	H19	3323	C12	7301	B 3
1324	B21	2359	D 4	3193	H17	3324	B15	7302	B 8
1326	P13	2360	E 4	3194	H18	3325	C12	7303	B33
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1342	M 9	2365	H 7	3199	H19	3330	C17	7311	C11
1343	M12	2366	I 7	3200	M32	3331	D14	7312	B11
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1421	E32	2369	H 5	3203	H33	3334	E16	7315	D11
1430	D31	2370	I 5	3204	I32	3335	E16	7316	H13
2101	J23	2371	L16	3205	I32	3336	E19	7317	K12
2102	K23	2372	L15	3207	I31	3338	J13	7318	J11
2103	J23	2373	L14	3208	K30	3339	J13	7319	K10
2104	J24	2374	K17	3209	K32	3340	F13	7320	H28
2105	K26	2375	M18	3210	L31	3341	I14	7321	L24
2106	J26	2376	L15	3211	K31	3342	G14	7322	M28
2107	J26	2377	L15	3212	L29	3343	I14	7323	G 6
2108	K25	2378	L14	3213	L29	3344	G15	7324	L15
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2232	C 4	2380	M17	3216	M33	3346	K11	7326	K13
2241	H29	2381	L18	3217	O32	3347	K10	7327	L17
2242	H29	2383	O 2	3218	N32	3348	K11	7328	L16
2247	B 1	2384	M 3	3219	L32	3349	K11	7329	L19
2248	C 1	2385	B 6	3220	M31	3350	K10	7330	L15
2249	O 1	2386	B 6	3221	M31	3351	K10	7331	M15
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2254	G31	2392	N25	3226	O 4	3356	F 6	7336	C22
2255	H32	2393	O26	3227	O 3	3357	E 5	7337	O 4
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2259	J33	2396	N23	3230	N 2	3360	F 5	7341	E 4
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2270	N29	3106	J25	3240	B31	3370	J 6	7351	K 2
2271	L32	3107	J25	3241	A32	3371	I 6	7352	K 4
2272	I33	3108	L 8	3242	B31	3372	J 6	7353	K 5
2273	K32	3109	K25	3243	J 7	3373	H 2	7355	B25
2275	I34	3110	I26	3244	C21	3374	I 2	7356	B24
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2279	M34	3114	L 8	3248	K 1	3378	I 3	7360	C29
2280	M34	3115	L 9	3249	K 5	3379	O14	7361	E29
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2285	E22	3119	M11	3253	E 4	3383	J10	7365	D29
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2292	I 5	3126	M12	3260	K 5	3390	K17	7372	F 8
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2298	F18	3130	E 8	3264	J25	3394	F26		
2299	G17	3131	F 7	3265	N27	3395	M16		
2300	L16	3132	G 7	3266	N27	3396	M16		
2301	B 2	3133	E 7	3267	N27	3397	M16		
2302	C 2	3134	F 7	3268	M26	3398	M15		
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2328	C17	3162	E26	3294	M 2	6305	J 5		
2329	E13	3163	E26	3295	M 3	6307	K 1		
2330	E17	3164	G 9	3296	L16	6308	B27		
2331	I11	3165	G 9	3297	K17	6309	C30		
2332	G11	3166	G10	3298	L17	6310	H17		
2333	E15	3167	I10	3299	L14	6321	M25		
2334	E17	3168	H11	3300	N26	6322	O24		
2335	I16	3169	B 7	3301	B 2	6323	O24		
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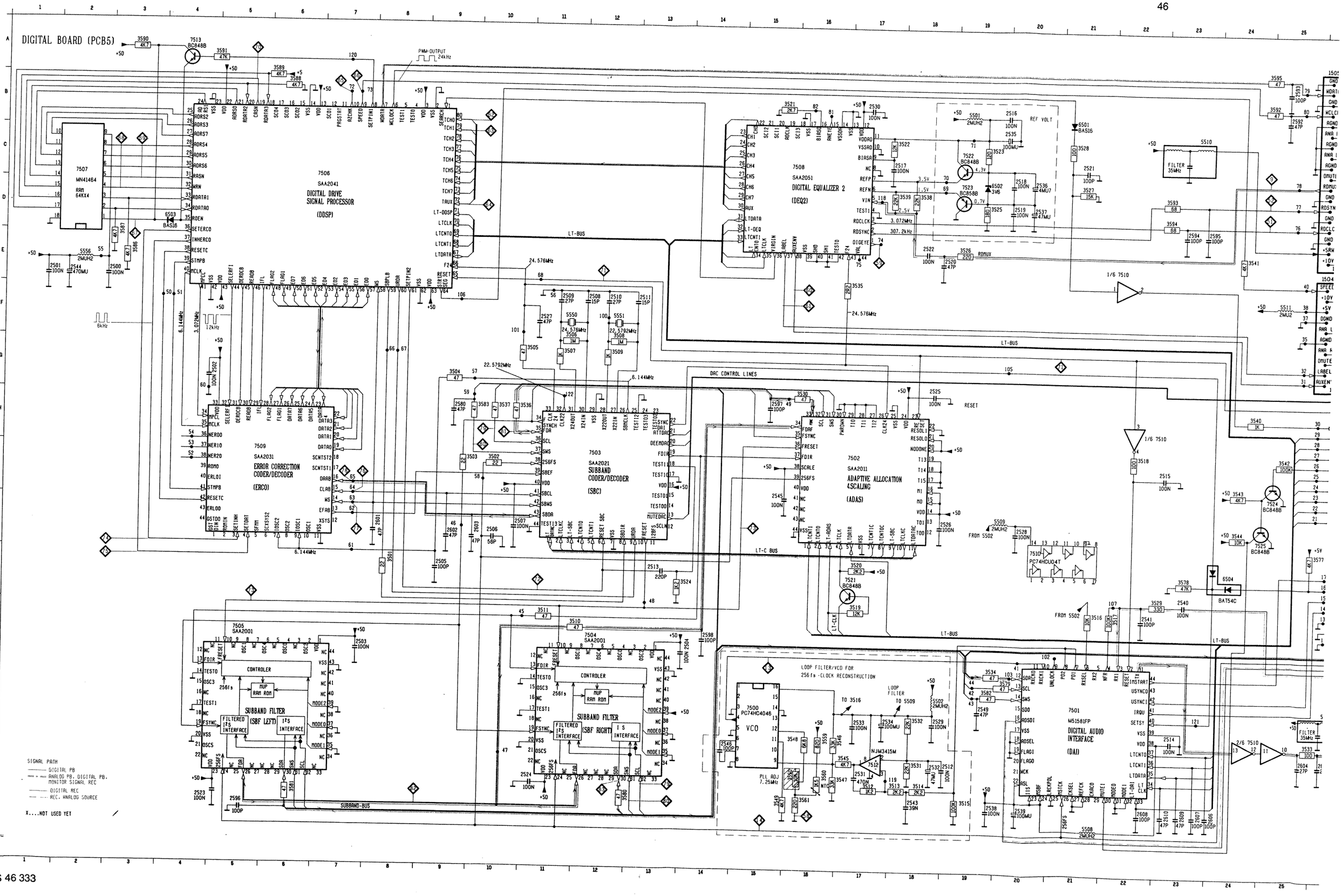
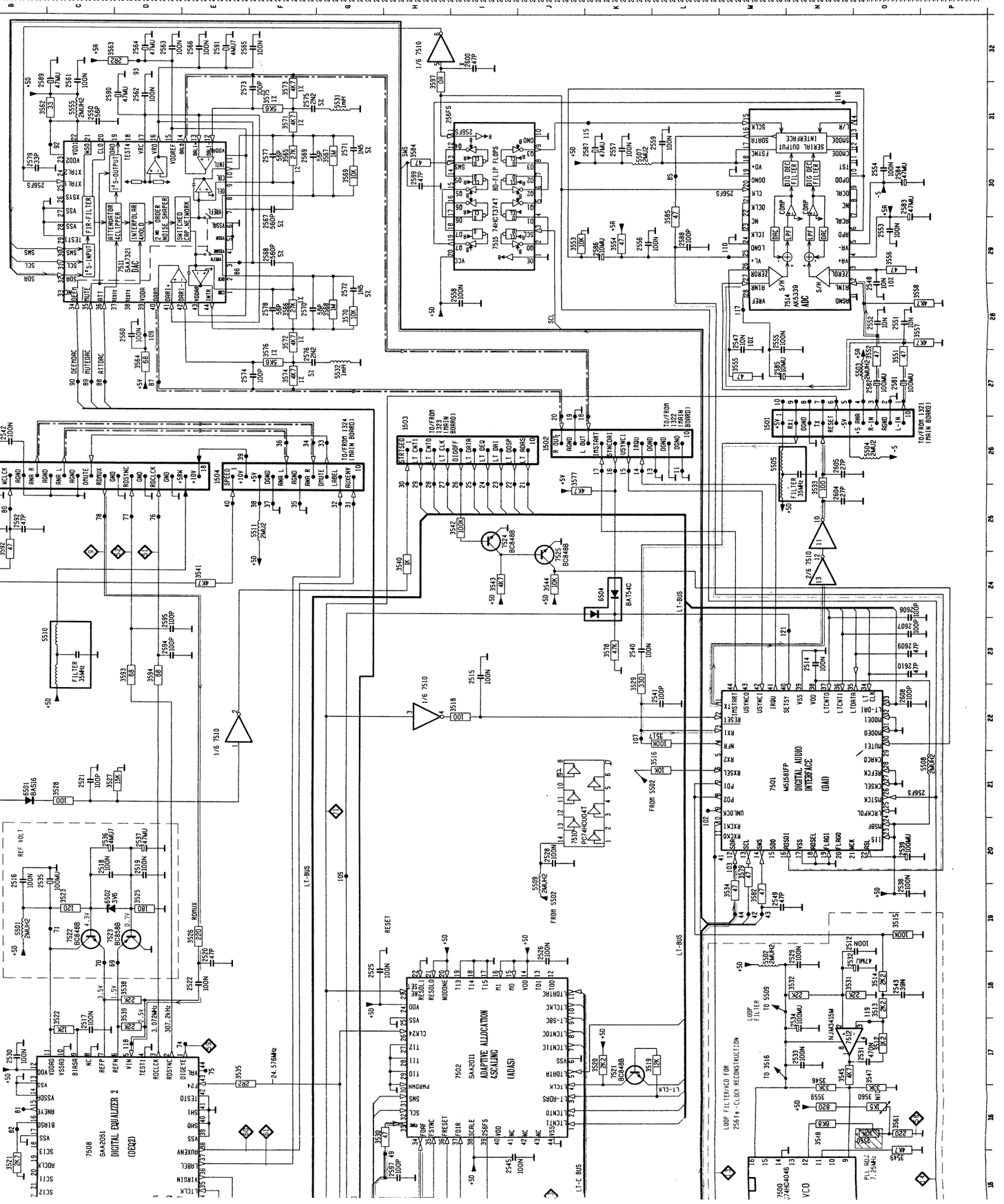

DIGITAL BOARD (PCB5)
7506
SAA2041
DIGITAL DRIVE SIGNAL PROCESSOR
(DDSP)
7507
MN41464
RAM 64Kx4
7508
SAA2051
DIGITAL EQUALIZER 2
(DEQ2)
7509
SAA2031
ERROR CORRECTION CODER/DECODER
(ERCO)
7503
SAA2021
SUBBAND CODER/DECODER
(SBC)
7502
SAA2011
ADAPTIVE ALLOCATION &SCALING
(ADAS)
7501
M51581FP
DIGITAL AUDIO INTERFACE
(DAI)
7505
SAA2001
7504
SAA2001
CONTROLER
SUBBAND FILTER
(SBF LEFT)
(SBF RIGHT)
7500
PC74HC4046
VCO
7510
PC74HCUQ4T
PWM-OUTPUT 24kHz
LT-BUS
LT-C BUS
SUBBAND-BUS
DAC CONTROL LINES
LOOP FILTER/VCO FOR 256fs -CLOCK RECONSTRUCTION
LOOP FILTER
REF VOLT
FILTER 35MHz
SIGNAL PATH
DIGITAL PB
ANALOG PB, DIGITAL PB, MONITOR SIGNAL REC
DIGITAL REC
REC, ANALOG SOURCE
X....NOT USED YET


7508 SAA2051 DIGITAL EQUALIZER 2 (DEQ2)
7502 SAA2011 ADAPTIVE ALLOCATION &SCALING (ADAS)
7501 M65581FP DIGITAL AUDIO INTERFACE (DAI)
7514 AK5339 ADC
7511 SAA7321 DAC
7515 74HCT374T 8D-FLIP FLOPS
7510 74HC4046 VCO
7512 NJM4415M
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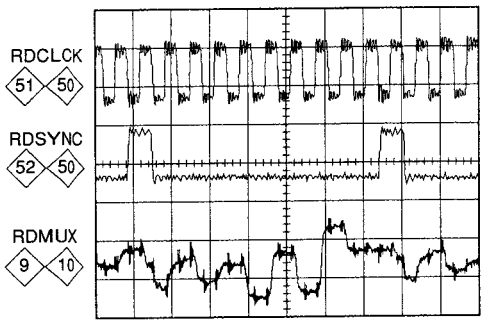
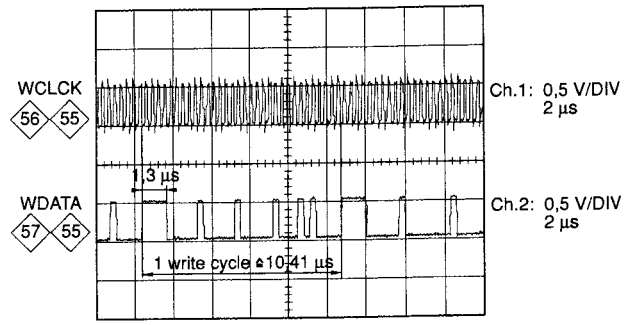
8000 74HC4046

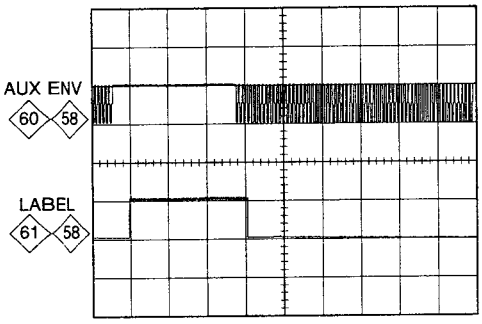
MEASUREMENTS ON DIGITAL BOARD PCB5

Note: All measurements carried out with digital oscilloscope and probe 10:1

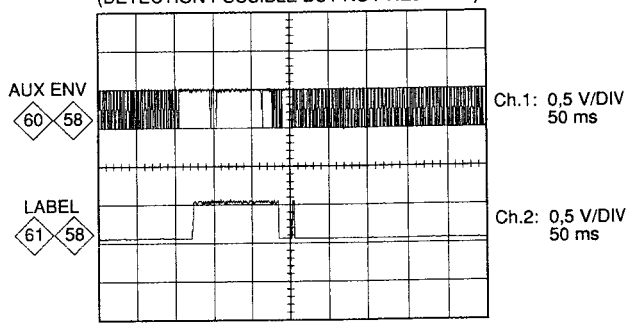




START MARKER (IDEAL)



START MARKER
(DETECTION POSSIBLE BUT NOT RELIABLE)



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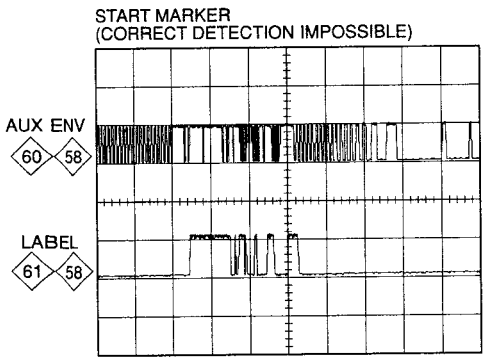
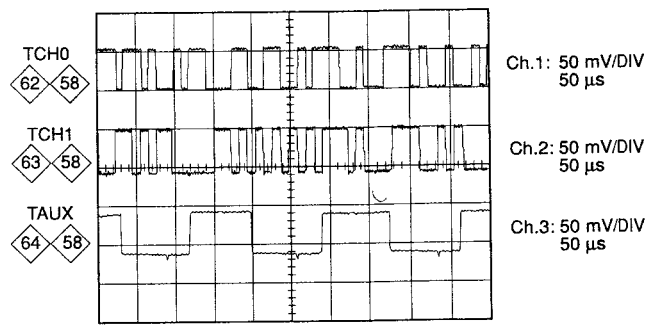
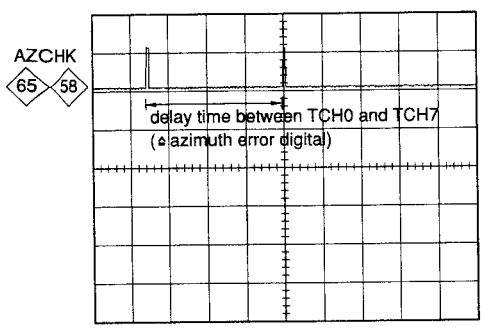
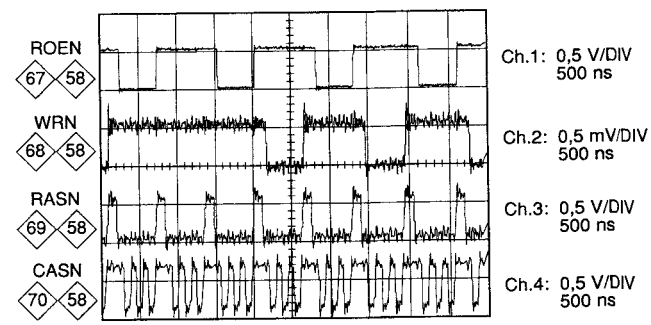
(CORRECT DETECTION IMPOSSIBLE)

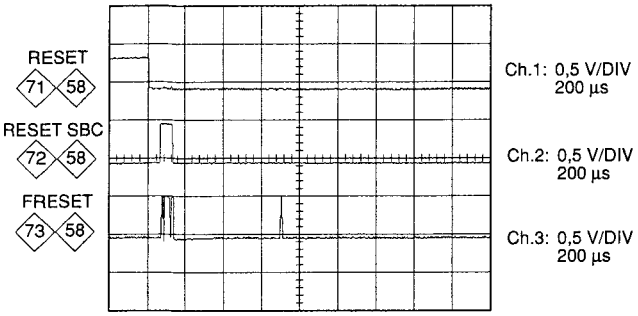


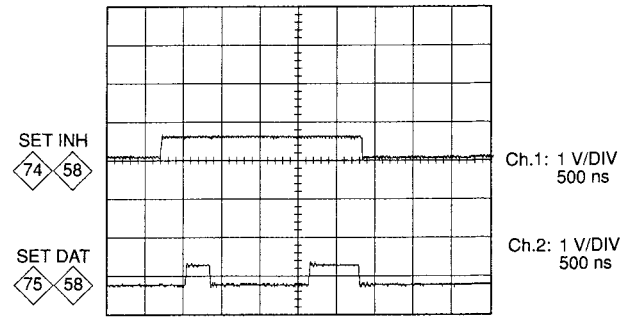


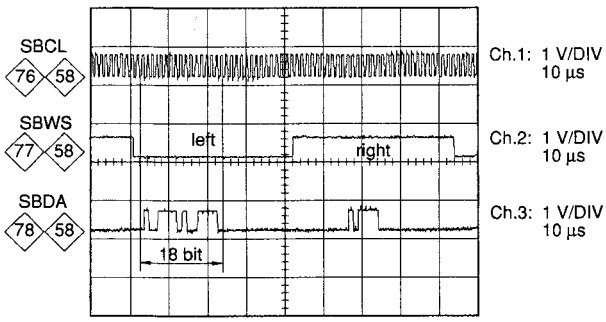


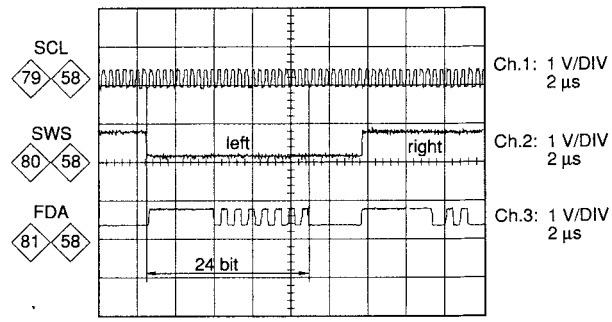


MEASUREMENTS ON DIGITAL BOARD PCB5 (CONTINUED)









2500 M2
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2513 I4
2515 E4
2516 M6
2518 L7
2519 L6
2520 M6
2521 L4
2522 M6
2528 F4
2533 F5
2541 E4
2542 N6
2543 F4
2545 G2
2547 C6
2548 C6
2549 F2
2553 D7
2554 D6
2555 B6
2556 B6
2557 B4
2560 J6
2562 J5
2563 I6
2580 J2
2588 D4
2594 M5
2595 M5
2596 C3
2597 I2
2599 D5
2600 H3
2601 J3
2602 I2
2603 I3
2604 H5
2605 G6
2606 F3
2607 F3
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2609 E3
2610 E3
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3504 I3
3511 D2
3512 F4
3513 G4
3514 G4
3518 F4
3526 M6
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3529 E4
3530 H2
3531 F5
3532 F5
3533 H5
3535 M4
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3537 G2
3538 M6
3539 L6
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3551 B7
3552 C7
3553 C6
3554 B7
3555 B6
3556 C7
3557 B6
3558 C7
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3564 I5
3577 F5
3578 F6
3583 J3
3584 D5
3585 D4
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3587 M2
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3593 L6
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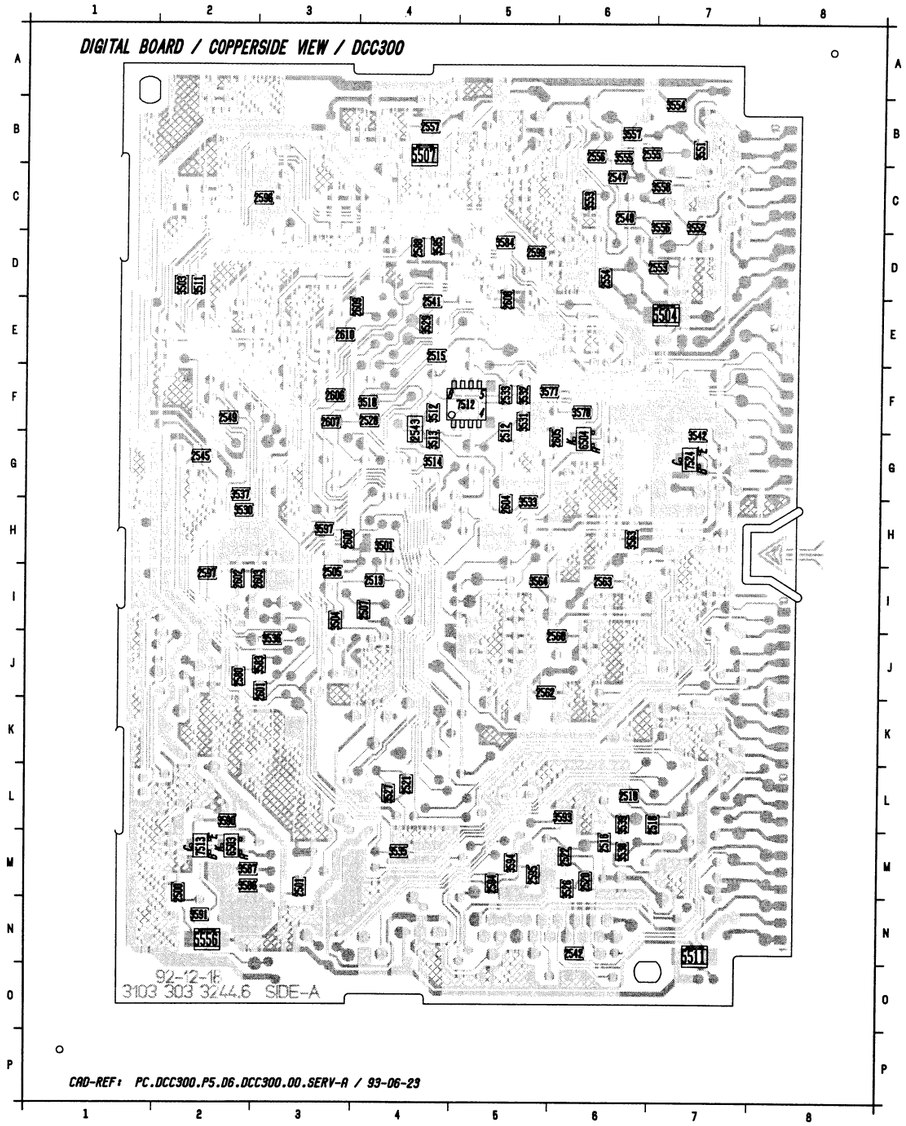
7513 M2
7524 G7



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2511 K5
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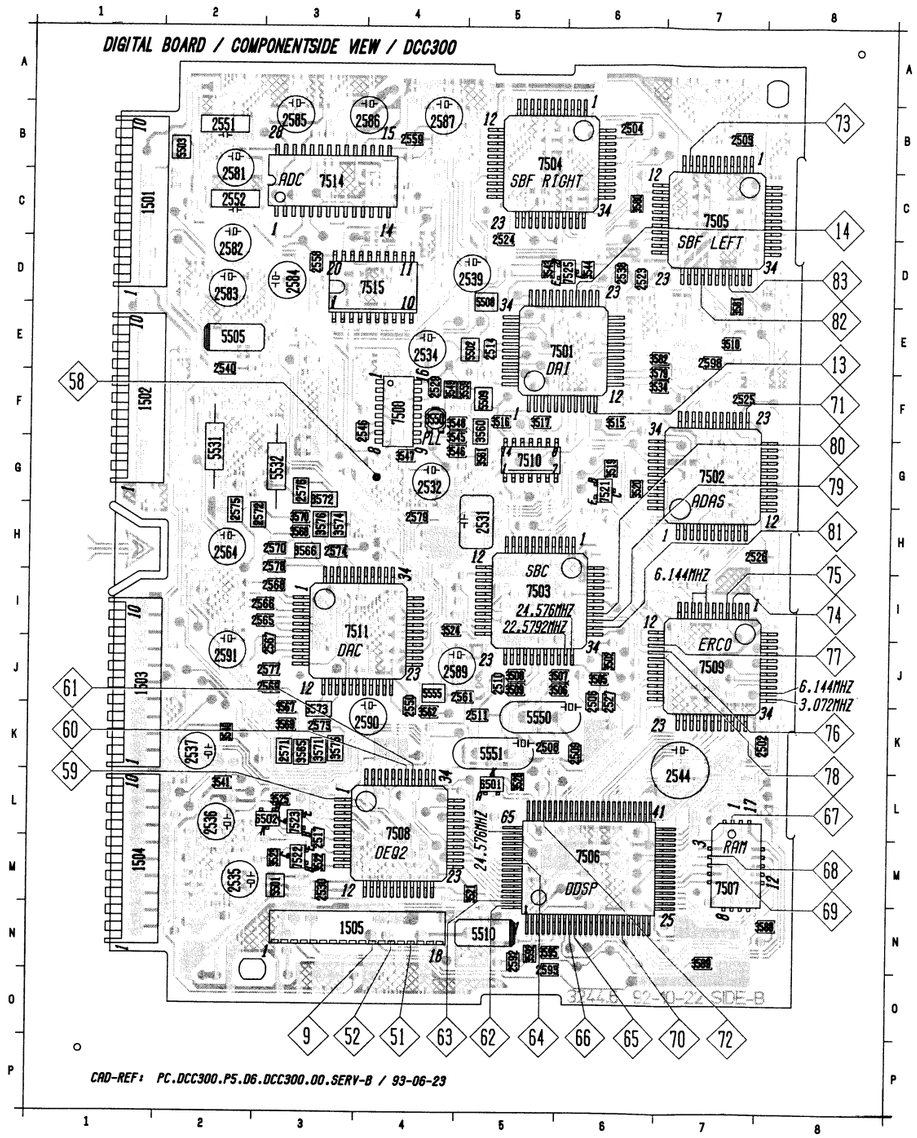
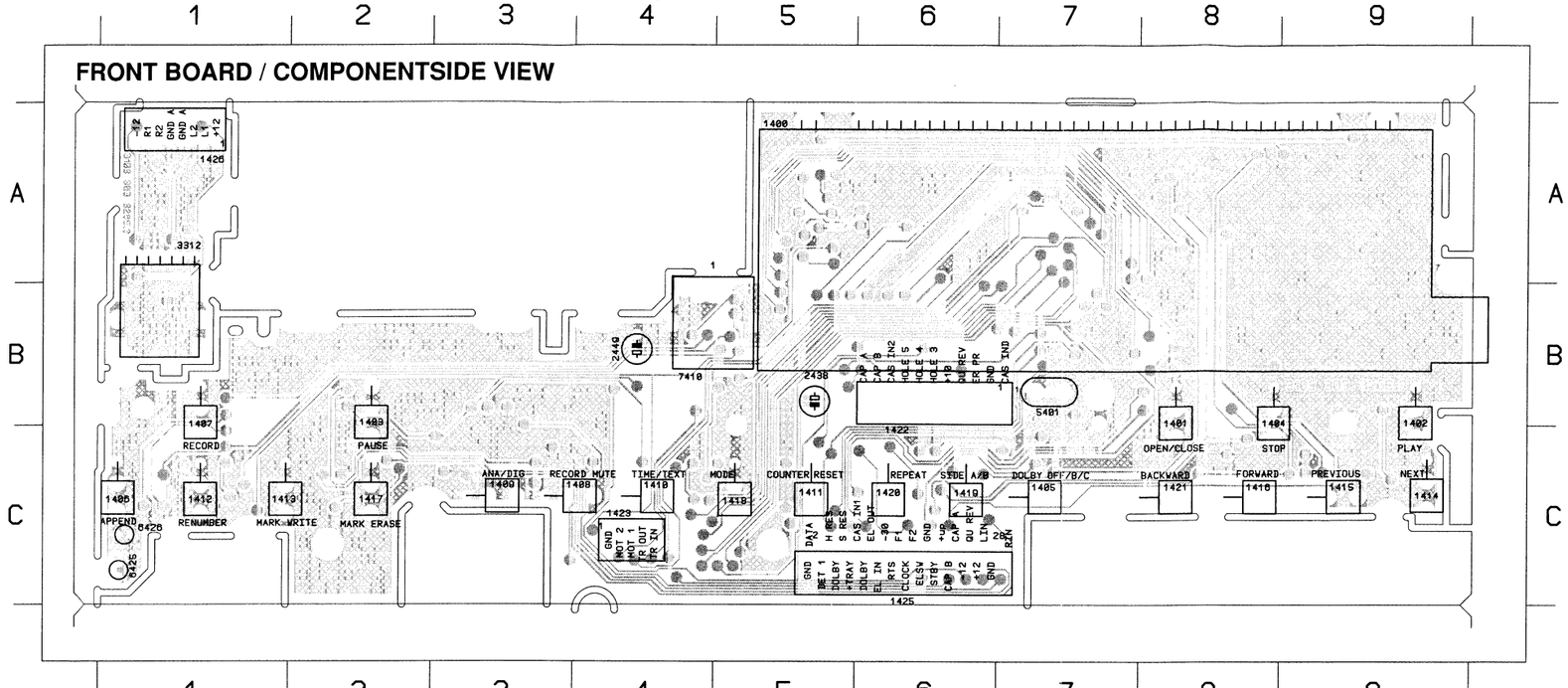


Note: The digital pcb is a four-layer board. As the two middle layers are just connected to +5D resp. GND these patterns are not shown.

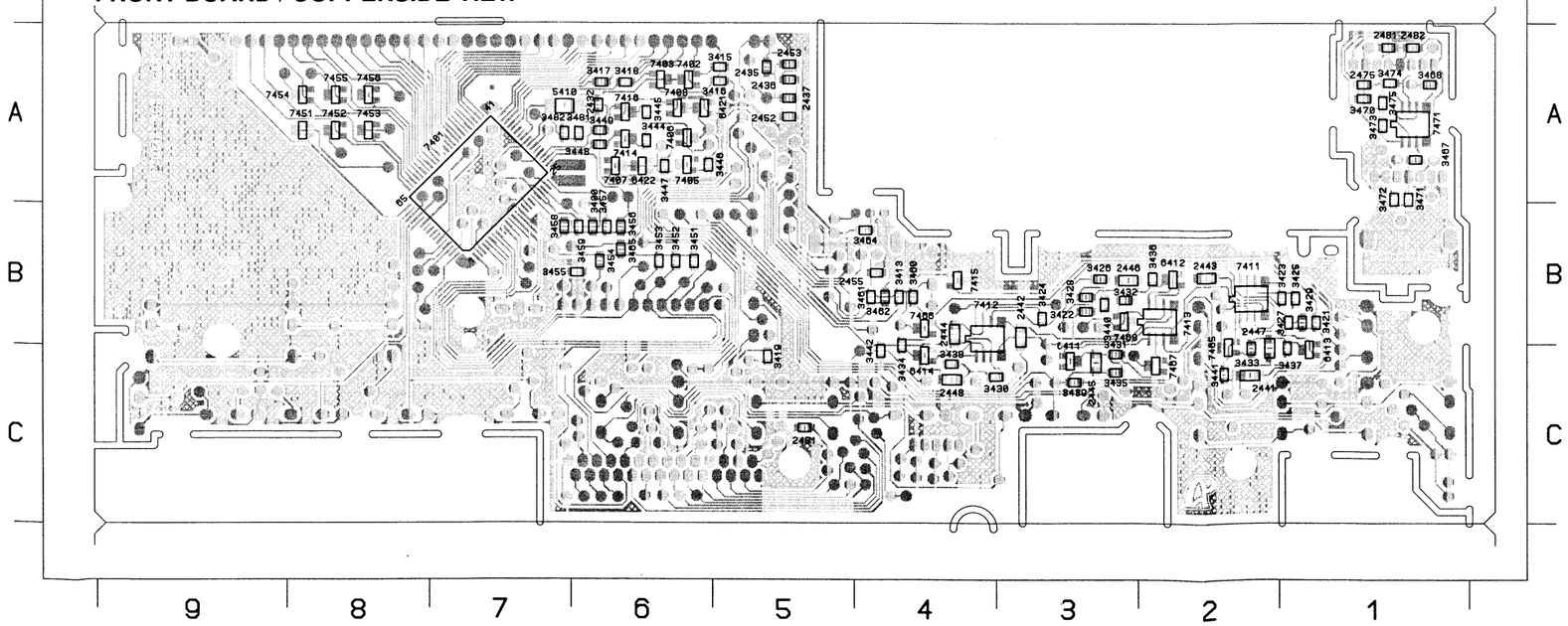
1400 A 7 1401 B 8 1402 B 9 1403 B 2 1404 B 8 1405 C 7 1406 C 1 1407 B 1 1408 C 3 1409 C 3 1410 C 4 1411 C 5 1412 C 1 1413 C 1 1414 C 9 1415 C 9 1416 C 8 1417 C 2 1418 C 5 1419 C 6 1420 C 6 1421 C 8 1422 B 6 1423 C 4 1425 C 6 1426 A 1 2438 B 5 2449 B 4 3312 B 1 5401 B 7 6425 C 1 6426 C 1 7410 B 4

FRONT BOARD / COMPONENTSIDE VIEW



2432 A 6 2435 A 5 2436 A 5 2437 A 5 2441 C 2 2442 B 3 2443 B 2 2444 B 4 2445 C 3 2446 B 3 2447 C 2 2448 C 4 2451 C 5 2452 A 5 2453 A 5 2455 B 4 2475 A 1 2481 A 1 2482 A 1 3400 B 6 3413 B 4 3415 A 5 3416 A 5 3417 A 6 3418 A 6 3419 C 5 3421 B 1 3422 B 3 3423 B 1 3424 B 3 3425 B 1 3426 B 3 3427 B 1 3428 B 3 3429 B 1 3431 C 3 3432 B 3 3433 C 2 3434 C 4 3435 C 3 3436 B 2 3437 C 1 3438 C 4 3439 C 3 3440 B 3 3441 C 2 3442 C 4 3444 A 6 3445 A 6 3446 A 6 3447 A 6 3448 A 6 3449 A 6 3451 B 6 3452 B 6 3453 B 6 3454 B 6 3455 B 6 3456 B 6 3457 B 6 3458 B 7 3459 B 6 3460 B 4 3461 B 4 3462 B 4 3463 B 4 3464 B 4 3465 B 6 3466 B 4 3467 A 1 3468 A 1 3470 A 1 3471 A 1 3472 A 1 3473 A 1 3474 A 1 3475 A 1 3481 A 6 3482 A 7 5410 A 7 6411 C 3 6412 B 2 6413 C 1 6414 C 4 6421 A 6 6422 A 6 7401 A 7 7402 A 6 7403 A 6 7405 A 6 7406 A 6 7407 A 6 7408 A 6 7411 B 2 7412 B 4 7413 B 2 7414 A 6 7415 B 4 7416 A 6 7451 A 8 7452 A 8 7453 A 8 7454 A 8 7455 A 8 7456 B 4 7457 C 2 7458 B 3 7471 A 1 T008 C 4 T009 C 4 T010 C 4 T011 C 4 T012 C 1 T015 A 5 T019 B 6 T020 B 6 T021 B 6 T022 B 6 T023 B 7 T024 C 7 T025 C 6 T026 B 3 T027 C 3 T028 B 4 T029 C 6 T030 C 6 T031 C 6 T032 C 4 T033 C 5 T034 C 5 T035 C 5 T036 C 5 T037 C 5 T040 C 3 T041 C 6 T042 A 5 T043 B 5 T044 B 6 T045 B 2 T046 B 5 T047 B 8 T048 C 4 T051 C 1 T052 C 1 T053 C 6 T054 C 6 T055 C 5

FRONT BOARD / COPPERSIDE VIEW



FRONT BOARD (PCB4)

1400
BJ021GK

TRACK REPEAT CONT
DIGITAL ANALOGUE
TRACK SIDE A-B TOTAL REM TIME WRITE MARK ERASE CC dcc
DOLBY B C NR
RECORD

FROM 1425/16
FROM 1425/14
3,9V AC

RECORD LEVEL CONTROL

1426
REC.LEVEL LEFT
REC.LEVEL RIGHT
NE5532MD 7471
TO/FROM 1302 (MAIN BOARD)

TRAY-MOTOR BRIDGE

CURRENT PATH DURING "TRAY OUT"
+TRAY
TO/FROM 1435 (TRAY IND BOARD)
TRAY OUT = HIGH
TRAY IN = HIGH
TRAY OUT = LOW
TRAY IN = LOW

CASSETTE INDICATION

TO/FROM 1601 (DCC INDIC.BOARD)
L = PROTECTED
H = DCC, L = CC

KEYBOARD - CONTROL

7451 - 7456 ARE USED AS DIODE

APPEND PREVIOUS STOP MARK WRITE OPEN/ CLOSE RENUMBER
RECORD NEXT PLAY MARK ERASE FORWARD ANA/DIG
PAUSE SIDE A/B REPEAT RECORD MUTE BACKWARD DOLBY OFF/B/C
COUNTER RESET MODE TIME TEXT

STANDBY-LED CIRCUIT

REM.: STANDBY-LED-CIRCUIT NOT USED IN DCC91 AND DCC450.

* for DCC91/450
** for OEM

IR-EYE CONTROL

IR-EYE
3465 only for DCC91
2449, 2455, 3464, 7410 only for DCC450

PEAK LEVEL DETECTION

LEFT LOW LEVEL -30 → -60dB
RIGHT LOW LEVEL -30 → -60dB
LEFT HIGH LEVEL 0 → -30dB
RIGHT HIGH LEVEL 0 → -30dB
FROM 1425/26 L IN
FROM 1425/28 R IN

VOLTAGES ON SEMICONDUCTERS DEPEND FROM INPUT - SIGNALS

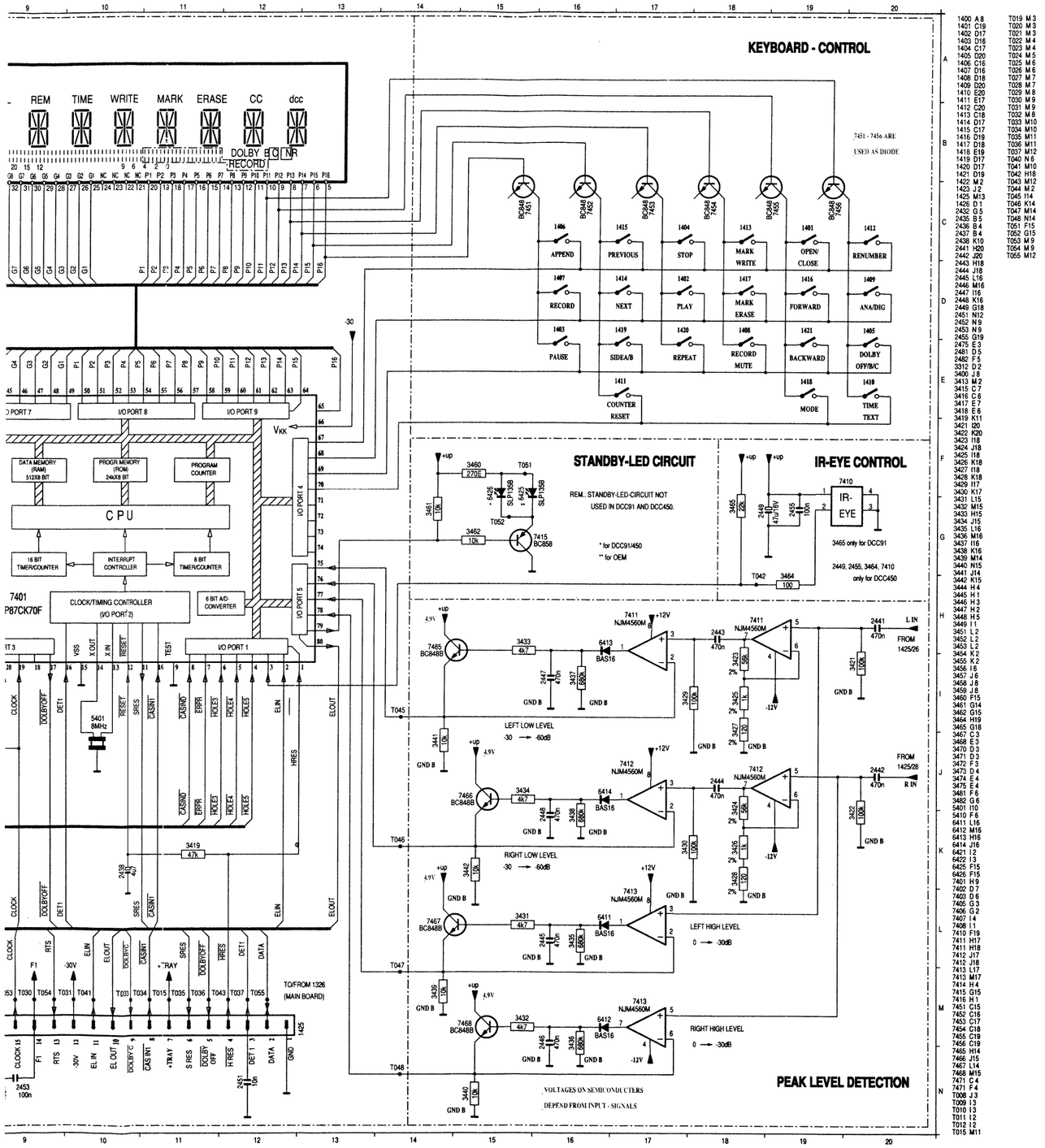
CPU

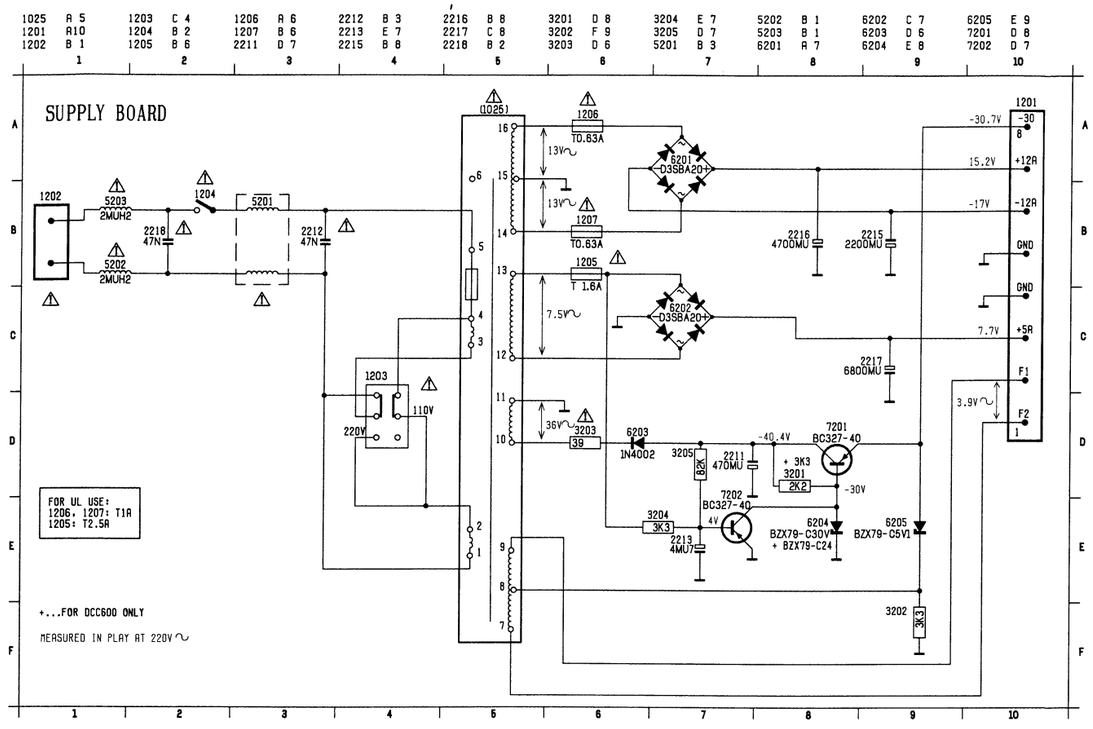
7401 TMP87CK70F
I/O PORT 7 I/O PORT 8 I/O PORT 9 I/O PORT 6 I/O PORT 4 I/O PORT 5 I/O PORT 3 I/O PORT 1 I/O PORT 0 I/O PORT 2
DATA MEMORY (RAM) 512X8 BIT
PROGR MEMORY (ROM) 24X8 BIT
PROGRAM COUNTER
16 BIT TIMER/COUNTER
INTERRUPT CONTROLLER
8 BIT TIMER/COUNTER
CLOCK/TIMING CONTROLLER (I/O PORT 2)
6 BIT A/D-CONVERTER
5401 8MHz

3481 for DCC91
3482 for DCC450
H = DCC91 L = DCC450

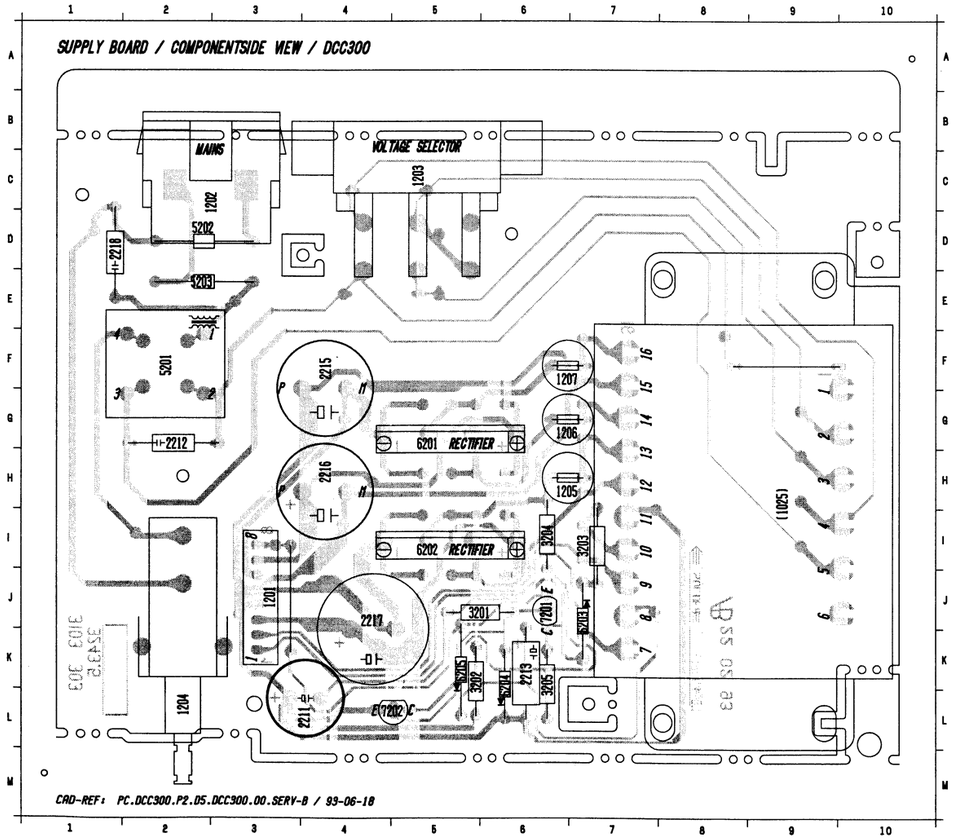
1400 A 8 T019 M 3
1401 C19 T020 M 3
1402 D17 T021 M 3
1403 D16 T022 M 4
1404 C17 T023 M 4
1405 D20 T024 M 5
1406 C16 T025 M 6
1407 D16 T026 M 6
1408 D18 T027 M 7
1409 D20 T028 M 7
1410 E20 T029 M 8
1411 E17 T030 M 9
1412 C20 T031 M 9
1413 C18 T032 M 8
1414 D17 T033 M10
1415 C17 T034 M10
1416 D19 T035 M11
1417 D18 T036 M11
1418 E19 T037 M12
1419 D17 T040 N 8
1420 D17 T041 M10
1421 D19 T042 M18
1422 M 2 T043 M12
1423 J 2 T044 M 2
1425 M13 T045 I14
1426 D 1 T046 K14
2432 G 5 T047 M14
2435 B 5 T048 N14
2436 B 4 T051 F15
2437 B 4 T052 G15
2438 K10 T053 M 9
2441 H20 T054 M 9
2442 J20 T055 M12
2443 H18
2444 J18
2445 L16
2446 M16
2447 I16
2448 K16
2449 G18
2451 N12
2452 N 9
2453 N 9
2455 G19
2475 E 3
2481 D 5
2482 F 5
3312 D 2
3400 J 8
3413 M 2
3415 C 7
3416 C 6
3417 E 7
3418 E 6
3419 K11
3421 I20
3422 K20
3423 I18
3424 J18
3426 K18
3427 I18
3429 I17
3430 K17
3431 L15
3432 M15
3433 H15
3434 J15
3435 L16
3436 M16
3437 I16
3438 K16
3439 M14
3440 N15
3441 J14
3442 K15
3444 H 4
3445 H 1
3446 H 3
3447 H 2
3448 H 5
3449 I 1
3451 L 2
3452 L 2
3453 L 2
3454 K 2
3455 K 2
3456 I 6
3457 J 6
3458 J 8
3459 J 8
3460 F15
3461 G14
3462 G15
3464 H19
3465 G18
3467 C 3
3468 E 3
3470 D 3
3471 D 3
3472 F 3
3473 D 4
3474 E 4
3475 E 4
3481 F 6
3482 G 6
5401 I10
5410 F 6
6411 L16
6412 M16
6413 H16
6414 J16
6421 I 2
6422 I 3
6425 F15
6426 F15
7401 H 9
7402 D 7
7403 D 6
7405 G 3
7406 G 2
7407 I 4
7408 I 1
7410 F19
7411 H17
7411 H18
7412 J17
7412 J18
7413 L17
7413 M17
7414 H 4
7415 G15
7416 H 1
7451 C15
7452 C16
7453 C17
7454 C18
7455 C19
7456 C19
7465 H14
7466 J15
7467 L14
7468 M15
7471 C 4
7471 F 4
T008 J 3
T009 I 3
T010 I 3
T011 I 2
T012 I 2
T015 M11

1025 R 5
1201 R10
1202 B 1
1
SUPPL
1202
FOR UL U
1206, 12
1205: T2
...FOR DC
MEASURED
CAD-REF:
SUPPL
CAD-R





CAD-REF: ES.DCC300.P2.DCC300.00.SH1.D05 (92-11-04)



CAD-REF: PC.DCC300.P2.D5.DCC300.00.SERV-B / 93-06-18

READ/WRITE BOARD (PCB7)

WRITE COILS

MAGNETO RES.HEADS

1701

TO/FROM OCC HEAD

READ AMPLIFIER

7703 TDA1317

ANALOG PB AMPLIFIER

MULTI PLEXER

7704 TDA1316

WRITE AMPLIFIER

CURRENT AMPLIFIER

VOLTAGE REFERENCE

PROTECTION

DECODER

CLAMP

7707 BC848B

DIGITAL MUTE

ONLY ACC

DMUTE

RDMUX-LEVEL

RDMUX

7705 BC848B

7706 BC858B

7708 LM78L05

7701 LM78L05

7702 LM78L05

6701 BAV99

6702 BAS16

MEASURING CONNECTOR FOR WRITE CURRENT

1706

ANALOG FEEDBACK LEVEL LEFT

ANALOG FEEDBACK LEVEL RIGHT

BIAS ADJ LEFT

BIAS ADJ RIGHT

7711 PLC 18V82J35A

7712 74HC02

7713 BC848B

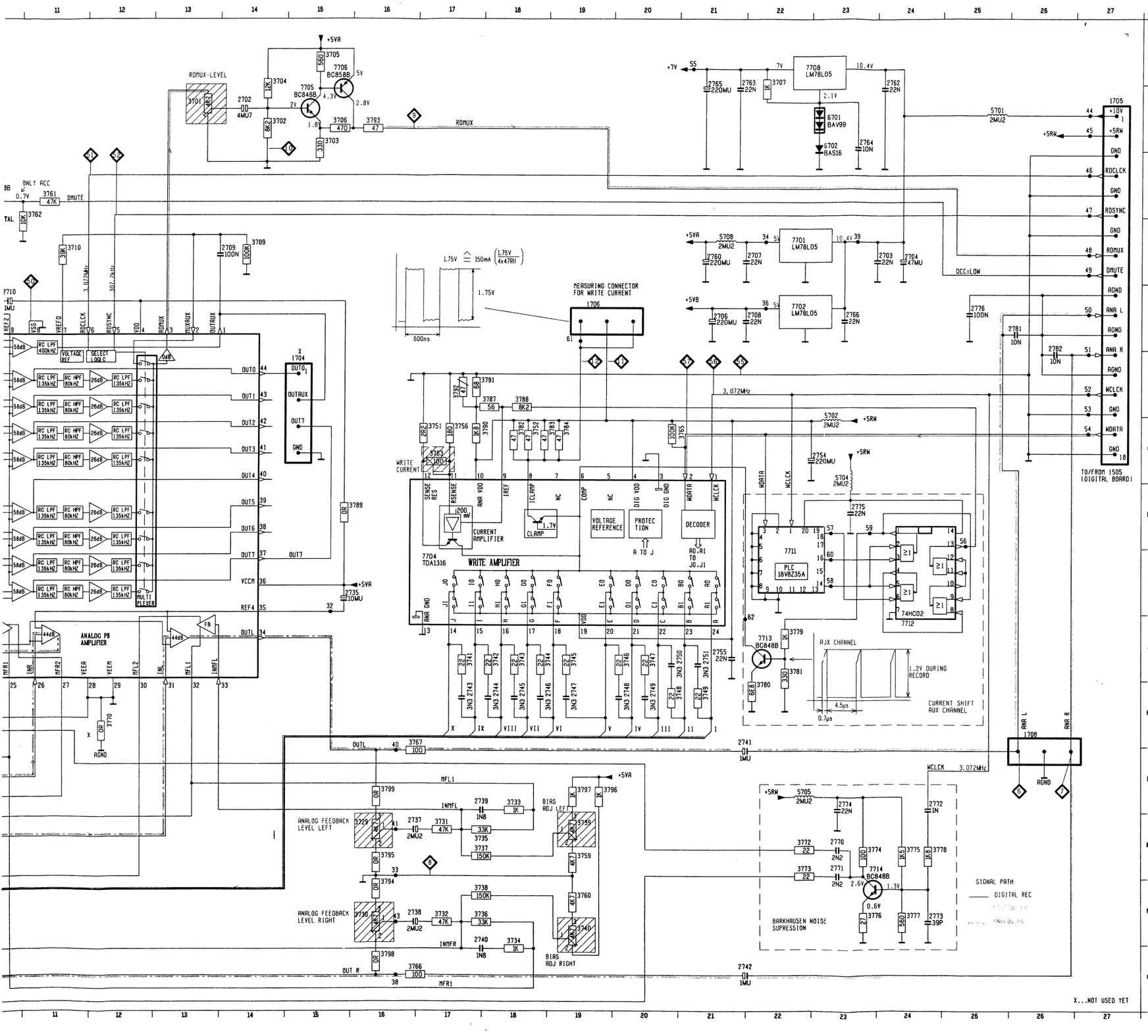
AUX CHANNEL

1.2V DURING RECORD

BARKHAUSEN NOISE SUPRESSION

7710 BC817-40

OCC-HEAD



1701	A 2	3752	G18
1702	I 2	3754	N 5
1704	F15	3755	O 6
A 1705	B27	3756	G17
1706	E19	3759	M19
1708	K26	3760	N19
2702	B14	3761	C11
2703	D23	3762	C10
2704	D24	3763	G17
2706	E21	3765	G21
2707	D21	3766	O17
2708	E21	3767	L17
B 2709	D19	3770	K12
2710	E10	3772	M22
2711	E 8	3773	M22
2712	F 8	3774	M23
2713	F 8	3775	M24
2714	G 8	3776	N23
2715	G 8	3777	N24
2716	H 8	3778	M24
C 2717	H 8	3779	J22
2718	I 8	3780	K22
2719	I 8	3781	J22
2720	E 4	3782	G18
2721	F 4	3783	G19
2722	F 4	3784	G19
2723	G 4	3787	F18
2724	G 4	3788	F18
D 2725	H 4	3789	H15
2726	H 4	3790	G18
2727	I 4	3791	F17
2728	I 4	3792	F17
2729	K 9	3793	B16
2730	K 9	3794	N16
2731	J 8	3795	M16
2732	J 8	3796	L19
E 2733	M 8	3797	L19
2734	L 8	3798	O16
2735	I15	3799	L16
2737	M17	5701	B25
2738	N17	5702	F23
2739	L18	5703	A 9
2740	N18	5704	Q23
2741	K22	5705	L22
F 2742	O22	5706	L 7
2743	K17	5707	M 7
2744	K18	5708	D21
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G 2750	J21	7704	I16
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2754	G23	7706	A15
2755	J21	7707	C10
2760	D21	7708	A22
2761	A 8	7710	N 6
2762	A24	7711	I22
2763	A21	7712	H24
H 2764	B23	7713	J22
2765	A21	7714	M24
2766	E23		
2769	O 6		
2770	M23		
2771	M23		
2772	L24		
2773	N24		
2774	L23		
I 2775	H23		
2776	E25		
2777	N 4		
2778	N 4		
2781	E26		
2782	E26		
3701	B13		
3702	B14		
J 3703	B15		
3704	A14		
3705	A15		
3706	B15		
3707	A22		
3709	D14		
3710	D11		
3711	A 8		
K 3712	A 7		
3713	A 7		
3714	A 7		
3715	A 6		
3716	A 6		
3717	A 5		
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3719	A 5		
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3744	J19		
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O 3747	J20		
3748	K21		
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3751	G17		

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2707 C5
2708 M1
2709 D4
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3713 I3
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3716 I2
3717 H2
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3798 C2
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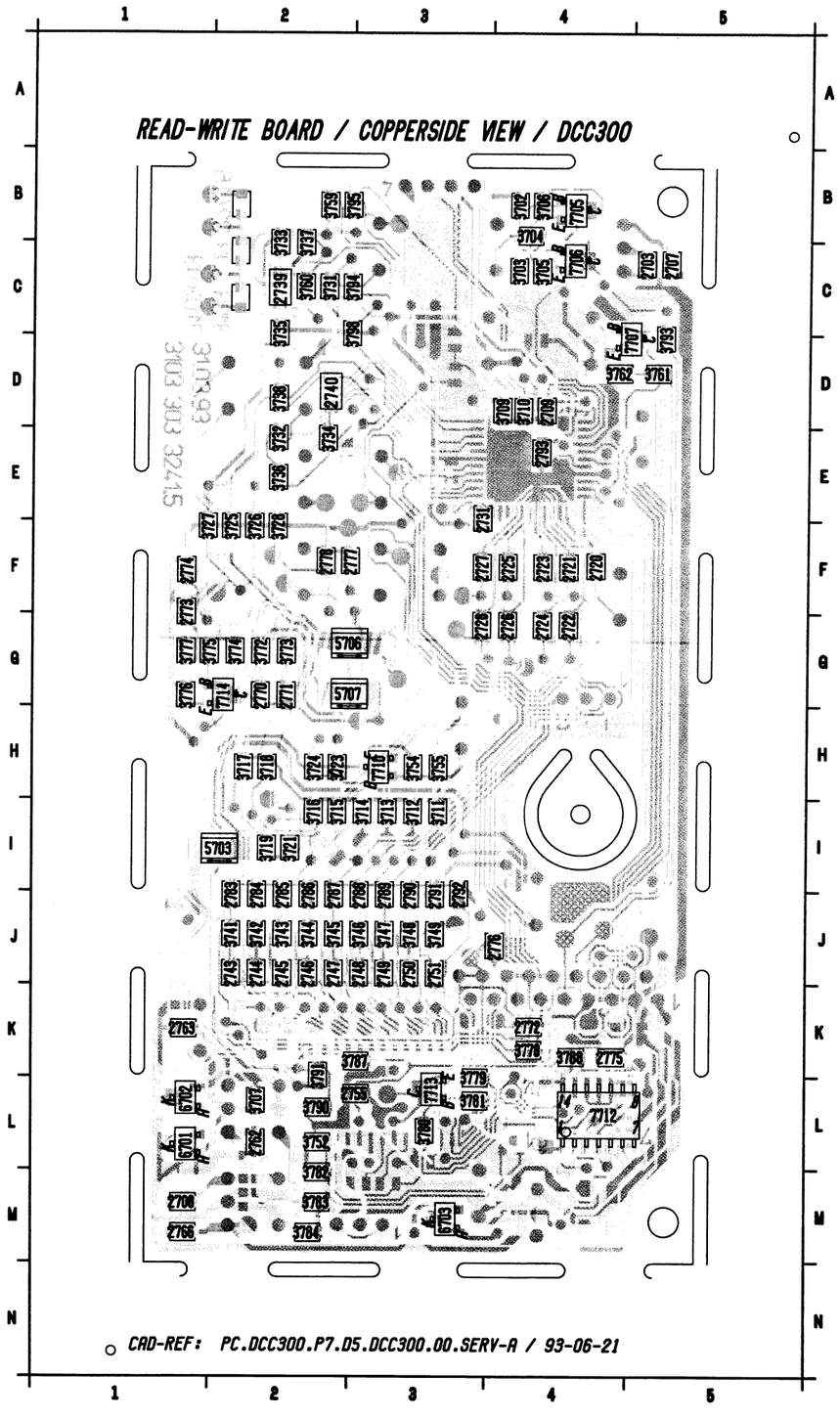
7714 G2



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2715 F2
2716 F2
2717 F2
2718 F3
2719 F3
2729 E3
2730 E3
2732 F3
2733 E4
2734 F4
2735 C3
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2741 E3
2742 F3
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2760 C2
2761 I2
2764 K5
2765 L4
2769 G3
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3767 D3
3789 C2
3792 D4
3796 C4
3797 B4
3799 C3
5701 M2
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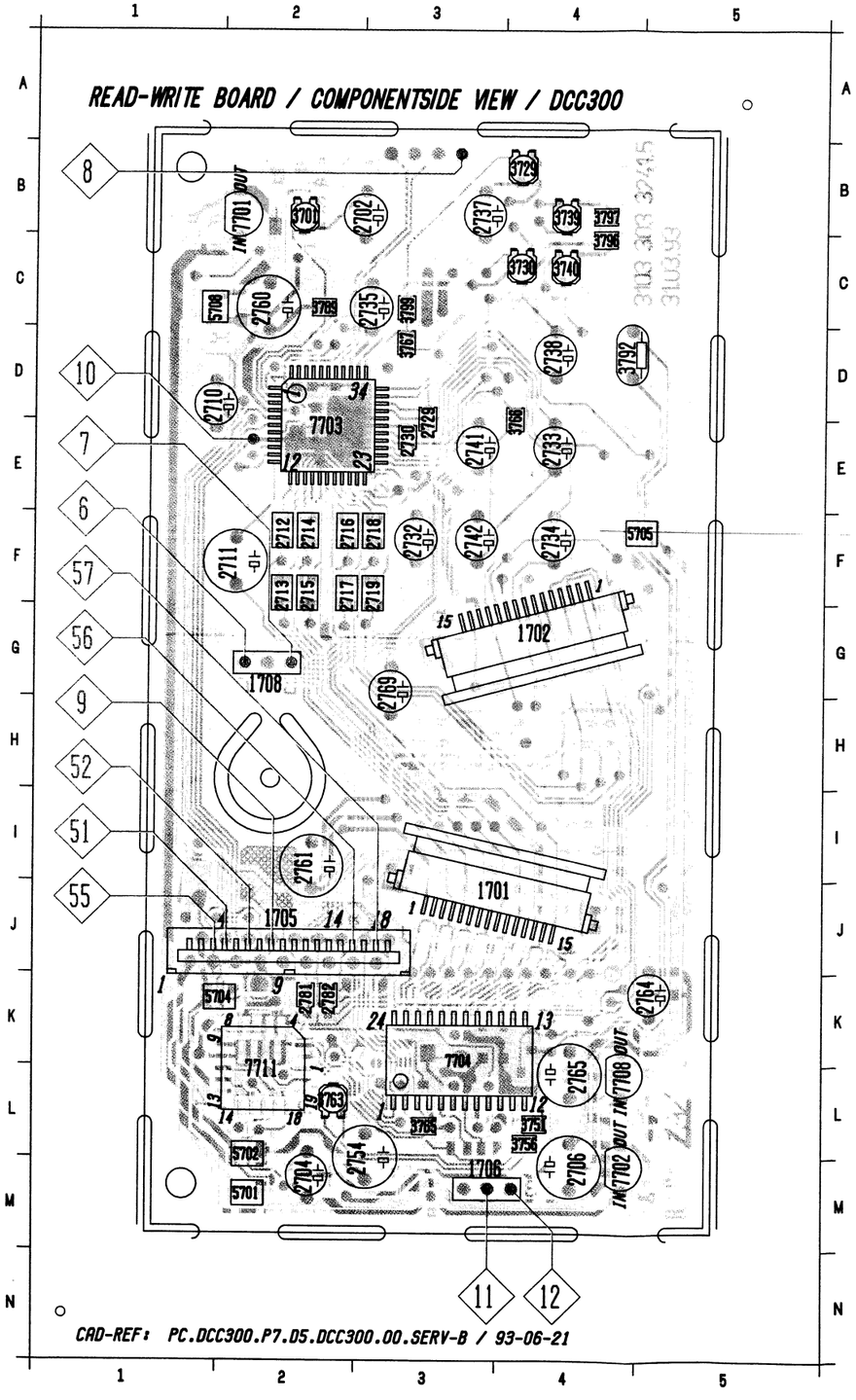
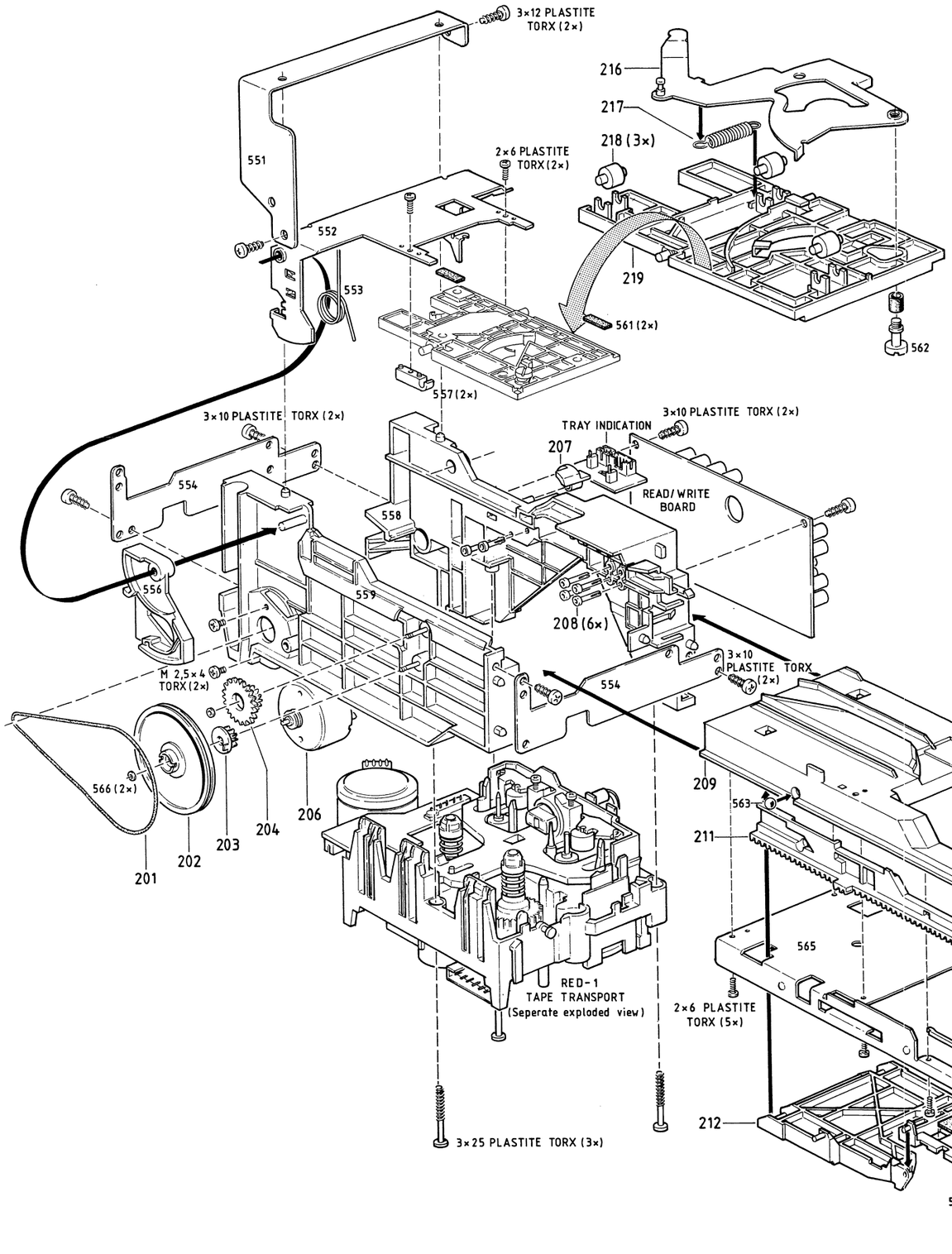
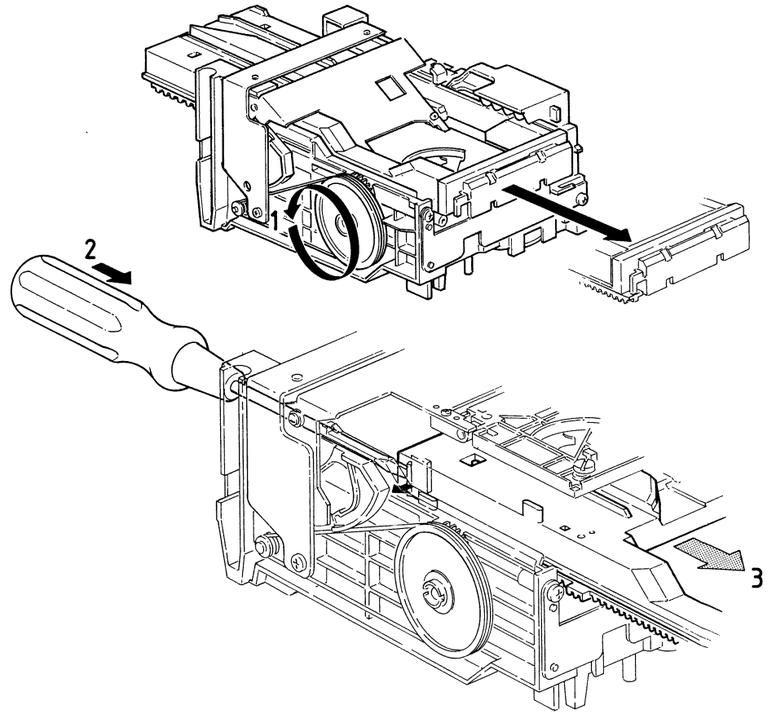


Exploded view Loading Assy

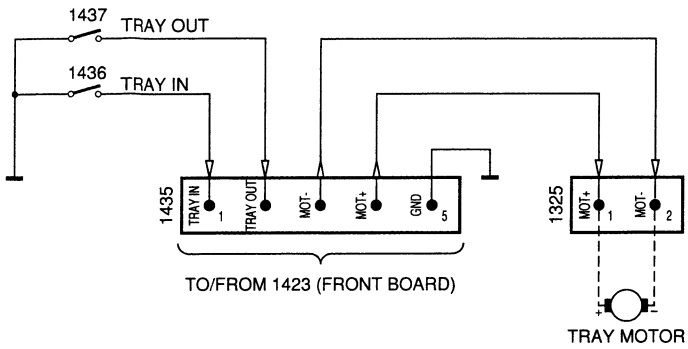




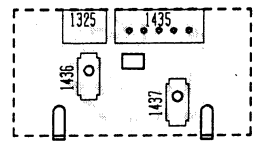
MECHANICAL PARTS LOADING ASSY (LDU1000)

	4822 691 20833	COMPLETE LOADING ASSY (LDU1000)
201	4822 358 30223	DRIVING BELT
202	4822 528 81495	BELT-WHEEL
203	4822 522 33347	GEAR (PUSH TRAY)
204	4822 522 33346	GEAR
206	4822 361 21598	MOTOR + PULLEY
207	4822 402 50303	SWITCH LEVER
208	4822 528 70809	GUIDING WHEEL
209	4822 443 63838	DRAWER
211	4822 522 20453	TOOTH RACK
212	4822 403 70851	HINGE BACK
213	4822 466 93225	LIFTPLATE
214	4822 403 70849	HINGE FRONT
216	4822 402 30169	CATCH LEVER ASSY
217	4822 492 33386	SPRING CATCH LEVER
218	4822 528 90639	ROLLER
219	4822 466 93226	STABILIZER
562	4822 502 21281	SCREW (CATCH LEVER)
	4822 502 21282	SCREW 2 x 5 PLASTITE
	4822 502 13886	SCREW 2 x 6 PLASTITE
	4822 502 21283	SCREW M 2,5 x 4

TRAY INDICATION BOARD (PCB 0)



TRAY INDICATION BOARD / DCC300
COMPONENTSIDE VIEW

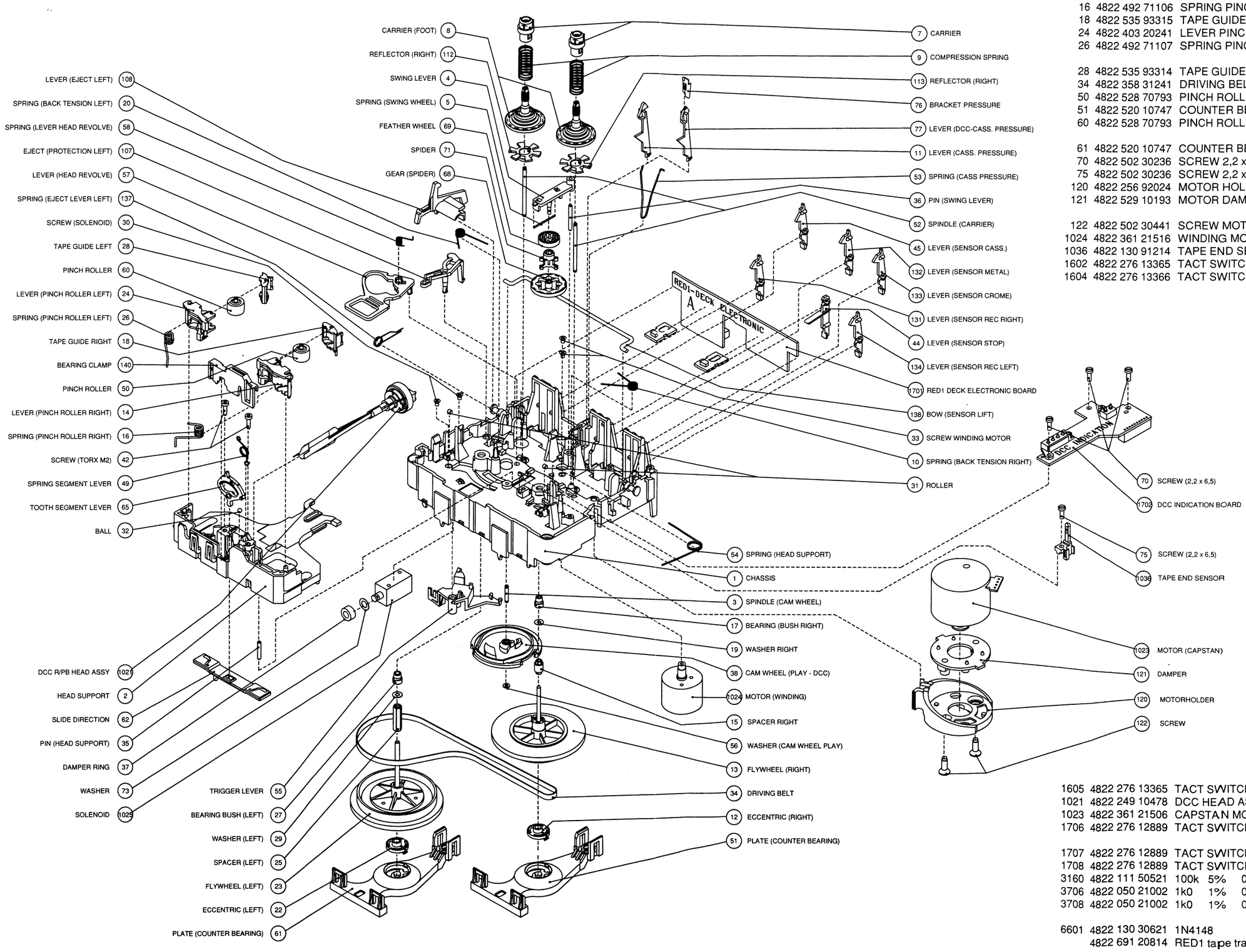


CAD-REF : PC.DCC300.PO.DI.DCC300.00.SERV-B
92-11-04

ELECTRICAL PARTSLIST

1436	4822 276 12889	SWITCH 100mA / 30V_{DC}
1437	4822 276 12889	SWITCH 100mA / 30V_{DC}

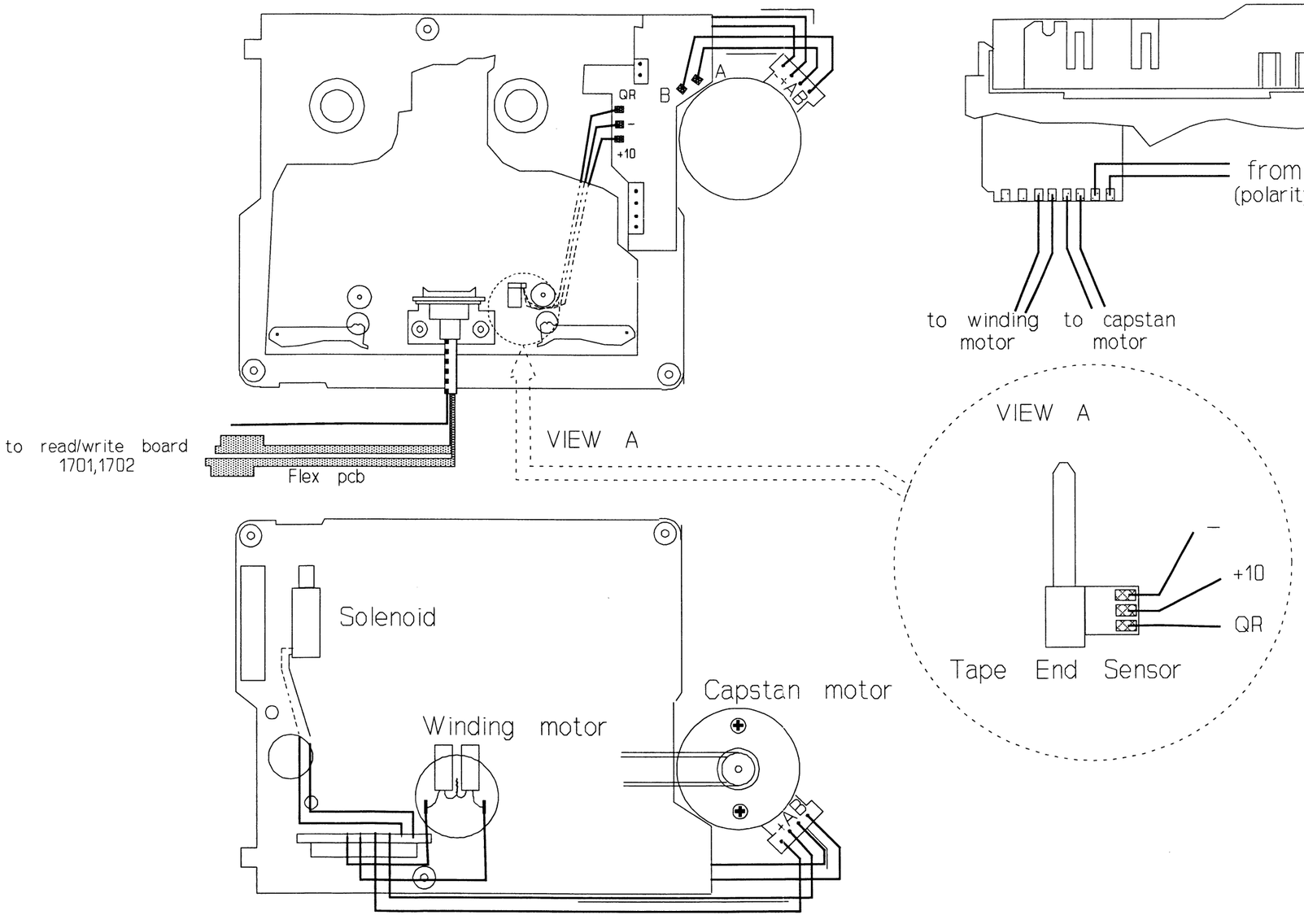
Exploded view RED Tape Transport

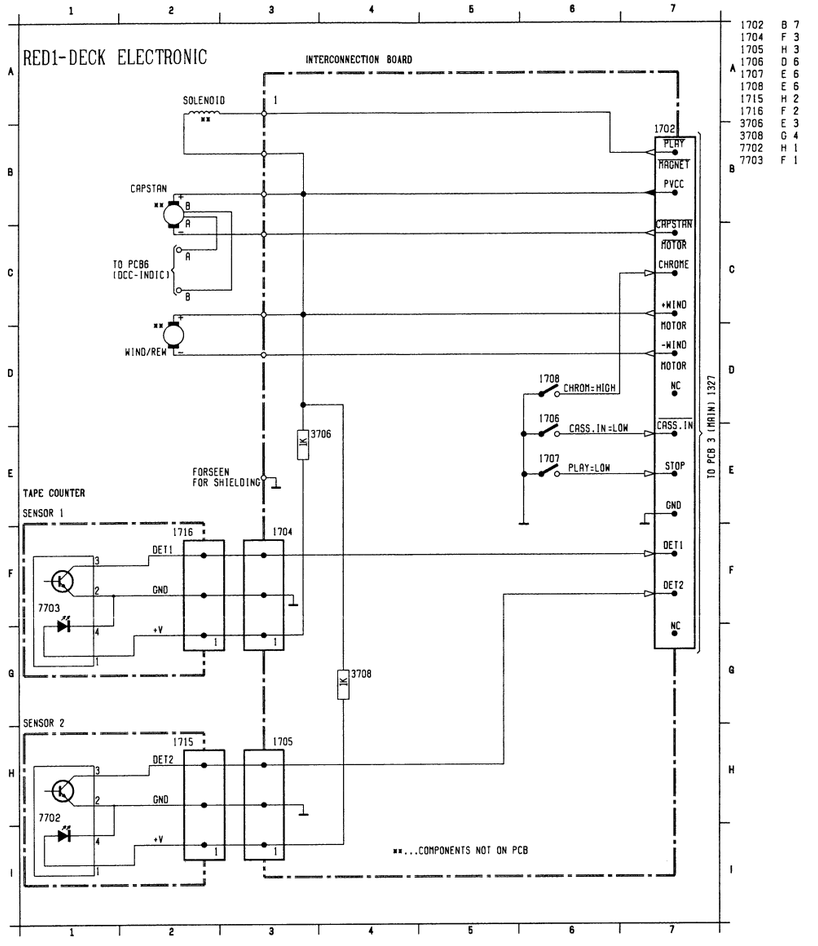


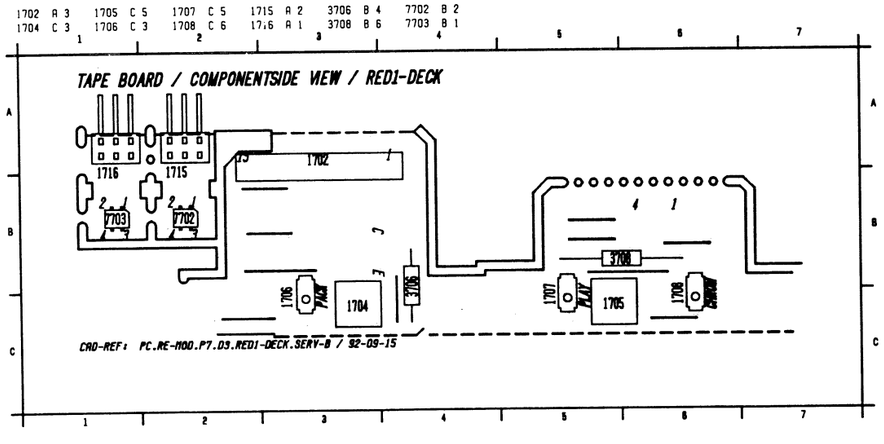
Partslist of RED1 Tape transport

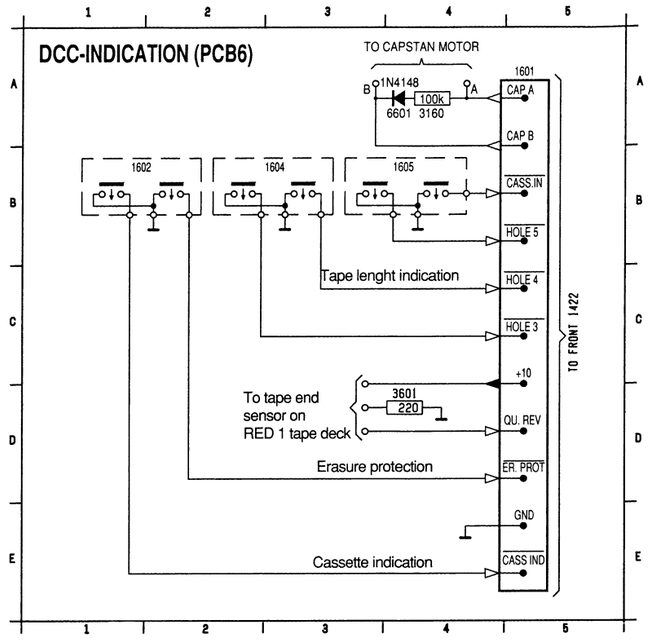
14	4822 403 20239	LEVER PINCH ROLLER RIGHT
16	4822 492 71106	SPRING PINCH ROLLER RIGHT
18	4822 535 93315	TAPE GUIDE RIGHT
24	4822 403 20241	LEVER PINCH ROLLER LEFT
26	4822 492 71107	SPRING PINCH ROLLER LEFT
28	4822 535 93314	TAPE GUIDE LEFT
34	4822 358 31241	DRIVING BELT
50	4822 528 70793	PINCH ROLLER
51	4822 520 10747	COUNTER BEARING PLATE RIGHT
60	4822 528 70793	PINCH ROLLER
61	4822 520 10747	COUNTER BEARING PLATE LEFT
70	4822 502 30236	SCREW 2,2 x 6,5
75	4822 502 30236	SCREW 2,2 x 6,5
120	4822 256 92024	MOTOR HOLDER
121	4822 529 10193	MOTOR DAMPER
122	4822 502 30441	SCREW MOTOR FIXATION
1024	4822 361 21516	WINDING MOTOR
1036	4822 130 91214	TAPE END SENSOR
1602	4822 276 13365	TACT SWITCH 10mA / 5V
1604	4822 276 13366	TACT SWITCH 10mA / 5V
1605	4822 276 13365	TACT SWITCH 10mA / 5V
1021	4822 249 10478	DCC HEAD ASSY
1023	4822 361 21506	CAPSTAN MOTOR
1706	4822 276 12889	TACT SWITCH
1707	4822 276 12889	TACT SWITCH
1708	4822 276 12889	TACT SWITCH
3160	4822 111 50521	100k 5% 0,6W
3706	4822 050 21002	1k0 1% 0,6W
3708	4822 050 21002	1k0 1% 0,6W
6601	4822 130 30621	1N4148
	4822 691 20814	RED1 tape transport

WIRING DIAGRAM TAPE TRANSPORT









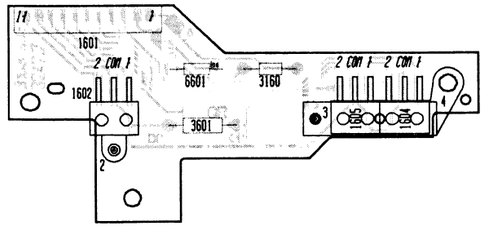
1601 A5
1602 B1
1604 B2
1605 B3
3160 A4
3601 D4
6601 A4

Tape length conversion table

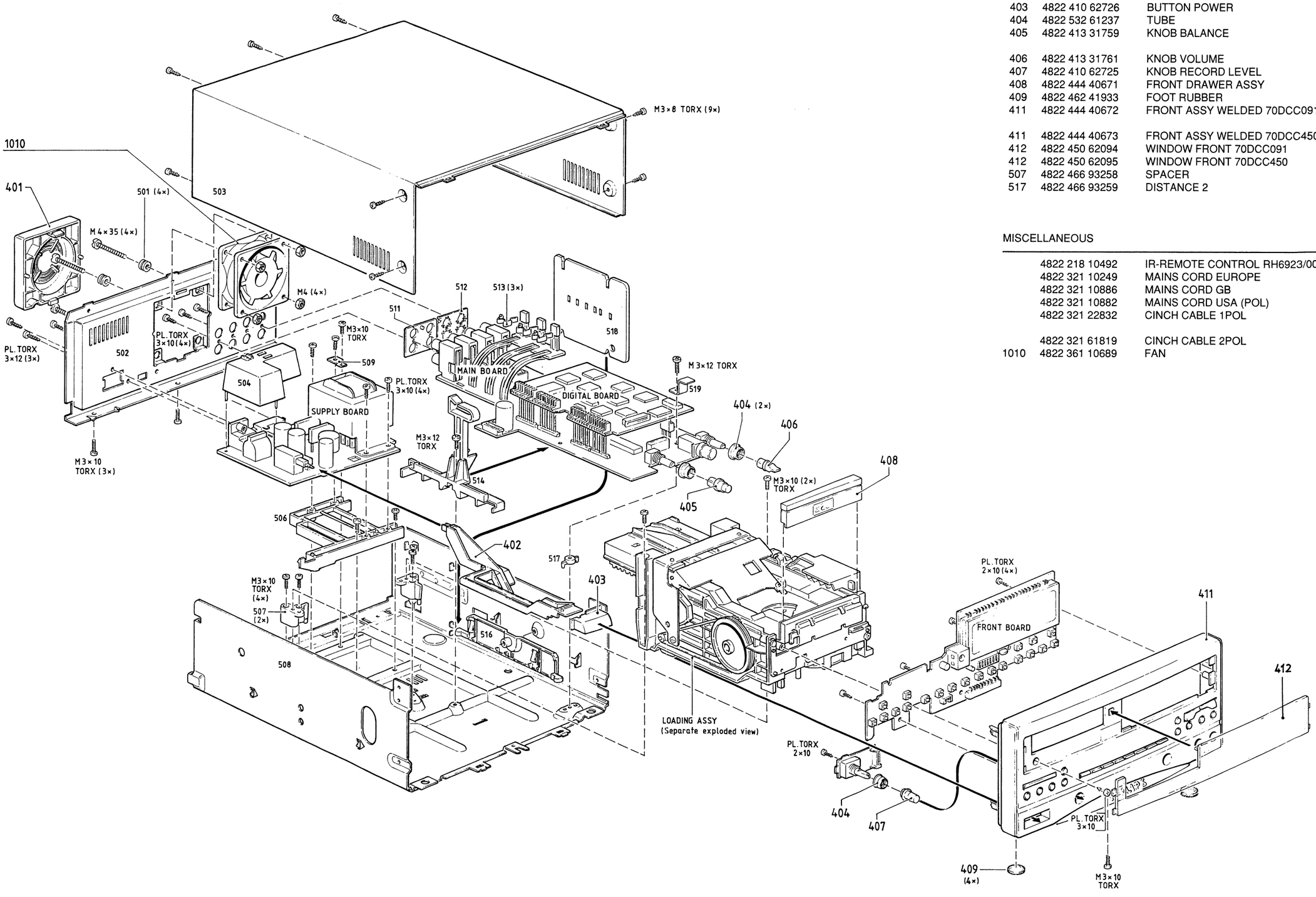
Hole \ Time	45	60	75	90	105	120
Hole 3	0	1	0	1	0	1
Hole 4	0	0	1	1	0	0
Hole 5	0	0	0	0	1	1

"0"..... open
"1"..... closed

DCC-INDICATION BOARD / COPPERSIDE VIEW



EXPLODED VIEW OF SET



MECHANICAL PARTSLIST

401	4822 444 60948	COVER-FAN
402	4822 402 50306	LEVER-POWER
403	4822 410 62726	BUTTON POWER
404	4822 532 61237	TUBE
405	4822 413 31759	KNOB BALANCE
406	4822 413 31761	KNOB VOLUME
407	4822 410 62725	KNOB RECORD LEVEL
408	4822 444 40671	FRONT DRAWER ASSY
409	4822 462 41933	FOOT RUBBER
411	4822 444 40672	FRONT ASSY WELDED 70DCC091
411	4822 444 40673	FRONT ASSY WELDED 70DCC450
412	4822 450 62094	WINDOW FRONT 70DCC091
412	4822 450 62095	WINDOW FRONT 70DCC450
507	4822 466 93258	SPACER
517	4822 466 93259	DISTANCE 2

MISCELLANEOUS

	4822 218 10492	IR-REMOTE CONTROL RH6923/00
	4822 321 10249	MAINS CORD EUROPE
	4822 321 10886	MAINS CORD GB
	4822 321 10882	MAINS CORD USA (POL)
	4822 321 22832	CINCH CABLE 1POL
	4822 321 61819	CINCH CABLE 2POL
1010	4822 361 10689	FAN

ELECTRICAL PARTSLIST

SUPPLY BOARD (PCB 2)

MISCELLANEOUS

1202	4822 265 31015	MAINS SOCKET
1202	4822 265 31016	MAINS SOCKET FOR /17
1203	4822 272 10269	VOLTAGE SELECTOR
1204	4822 276 13277	POWER SWITCH
1205	4822 071 51602	FUSE T1,6A
1206	4822 071 56309	FUSE T 630mA UL
1207	4822 071 56309	FUSE T 630mA UL
1025	4822 146 31192	MAINS TRANSFORMER

DIODES

6201	4822 130 82079	D3SBA20
6202	4822 130 82079	D3SBA20
6203	5322 130 30684	1N4002
6204	4822 130 80928	BZX79-C30
6205	4822 130 34233	BZX79-B5V1

TRANSISTORS

7201	4822 130 41327	BC327-40

COILS

5201	4822 157 63756	LINE CHOKE
5202	4822 157 50963	2,2µH
5203	4822 157 50963	2,2µH

RESISTORS

3201	4822 050 22202	2k2	1%	0,6W
3202	4822 050 23302	3k3	1%	0,6W
3203	4822 052 10399	39R	5%	0,33W

CAPACITORS

2210	4822 121 41857	10nF	5%	250V
2211	4822 124 23172	470µF	20%	50V
2212	4822 121 70087	47nF	10%	250V
2213	4822 124 22337	22µF	20%	63V
2214	4822 122 10176	4,7nF	10%	50V
2215	4822 124 80253	2200µF	20%	25V
2216	4822 124 42334	4700µF	20%	25V
2217	4822 124 80406	6800µF	20%	16V
2218	4822 121 70087	47nF	10%	250V

MAIN BOARD (PCB 3)

MISCELLANEOUS

	4822 255 40128	CLIP TO126
1301	4822 267 31649	DOUBBLE CINCH SOCKET
1306	4822 267 31649	DOUBBLE CINCH SOCKET
1307	4822 280 80762	RELAY
1311	4822 267 40661	PHONE SOCKET
1315	4822 267 31651	DOUBBLE CINCH SOCKET
1337	4822 071 53151	FUSE 315mA

DIODES

6101	5322 130 34337	BAV99
6206	5322 130 34337	BAV99
6207	5322 130 31937	BZX84-B4V7
6208	5322 130 31928	BAS16
6209	5322 130 31928	BAS16
6210	5322 130 31928	BAS16
6301	5322 130 31928	BAS16
6302	5322 130 31928	BAS16
6303	5322 130 33671	BZX84-C6V2
6305	5322 130 31928	BAS16
6307	5322 130 32835	BZX84-C5V1
6308	5322 130 31928	BAS16
6310	5322 130 31928	BAS16
6321	5322 130 31928	BAS16
6322	4822 130 81424	BZX75-C2V1
6323	4822 130 81424	BZX75-C2V1

TRANSISTORS

7101	5322 130 42136	BC848C
7102	5322 130 42136	BC848C
7103	4822 130 42513	BC858C
7104	5322 130 42136	BC848C
7200	4822 130 42513	BC858C
7202	4822 130 42513	BC858C
7204	5322 130 42136	BC848C
7206	5322 130 42136	BC848C
7207	4822 130 42513	BC858C
7209	4822 130 42513	BC858C
7210	5322 130 42136	BC848C
7211	4822 130 42513	BC858C
7213	4822 130 40995	BD434
7215	4822 130 40995	BD434
7218	4822 130 40982	BD433
7309	4822 130 61207	BC848
7311	4822 130 61207	BC848
7312	4822 130 61207	BC848
7313	4822 130 61207	BC848
7314	4822 130 61207	BC848
7315	5322 130 42012	BC858
7317	4822 130 61207	BC848
7318	5322 130 42012	BC858
7319	5322 130 42012	BC858
7322	5322 130 42136	BC848C
7324	4822 130 61207	BC848
7327	4822 130 61207	BC848
7328	4822 130 61207	BC848
7329	4822 130 61207	BC848
7330	4822 130 61207	BC848
7331	4822 130 61207	BC848
7332	4822 130 61207	BC848
7333	5322 130 42012	BC858
7334	4822 130 61207	BC848
7336	4822 130 61207	BC848

TRANSISTORS

7337	4822 130 61207	BC848
7338	5322 130 42012	BC858
7339	5322 130 42136	BC848C
7341	4822 130 42615	BC817-40
7342	4822 130 42615	BC817-40
7343	4822 130 42615	BC817-40
7344	4822 130 42615	BC817-40
7345	4822 130 42615	BC817-40
7346	4822 130 42615	BC817-40
7347	4822 130 42615	BC817-40
7348	4822 130 42615	BC817-40
7349	5322 130 42012	BC858
7350	5322 130 42136	BC848C
7351	5322 130 42136	BC848C
7352	5322 130 42136	BC848C
7353	4822 130 61207	BC848
7355	4822 130 42615	BC817-40
7356	5322 130 42012	BC858
7357	4822 130 61207	BC848
7358	5322 130 61569	BC868
7359	4822 130 61207	BC848
7360	4822 130 42615	BC817-40
7361	4822 130 42615	BC817-40
7362	4822 130 42615	BC817-40
7363	5322 130 60123	BC807-40
7364	5322 130 60123	BC807-40
7365	5322 130 60123	BC807-40
7366	4822 130 61207	BC848
7367	4822 130 61207	BC848
7368	4822 130 61207	BC848
7369	5322 130 42136	BC848C
7370	5322 130 42136	BC848C
7371	5322 130 42012	BC858
7372	5322 130 42012	BC858

INTEGRATED CIRCUITS

7201	5322 209 60749	LM2931Z-5.0
7212	4822 209 73233	MC79L05ACP
7301	4822 209 32002	NJM5532MD
7302	4822 209 32002	NJM5532MD
7303	4822 209 73157	NJM3415M
7305	4822 209 32002	NJM5532MD
7308	4822 209 83357	NJM4560M
7310	4822 209 83357	NJM4560M
7316	4822 209 31134	CXA1331S
7320	4822 209 83357	NJM4560M
7321	4822 209 31615	LM324A
7323	4822 209 31378	NJM4556M
7325	4822 209 83357	NJM4560M
7326	4822 209 83706	BA335
7335	4822 816 50056	P87C528 EBPN

COILS

5301	4822 157 62216	COIL 100µH
5302	4822 157 62216	COIL 100µH
5309	4822 157 70299	2,2µH
5310	4822 157 70299	2,2µH
5313	4822 157 70299	2,2µH
5314	4822 157 70299	2,2µH
5315	4822 157 50963	2,2µH
5317	4822 148 80281	COIL 100µH
5320	4822 157 52983	22µH
5325	4822 242 81357	RESONATOR 16MHz

RESISTORS

3110	4822 050 21804	180k	1%	0,6W
3113	4822 052 10159	15R	5%	0,33W
3151	4822 052 10478	4R7	5%	NFR
3152	4822 052 10478	4R7	5%	NFR
3180	4822 052 10478	4R7	5%	NFR
3203	4822 050 21501	150R	1%	0,6W
3209	4822 050 25601	560R	1%	0,6W
3216	4822 050 25601	560R	1%	0,6W
3239	4822 053 12159	15R	5%	3W
3277	4822 053 12339	33R	5%	3W
3305	4822 050 21802	1k8	1%	0,6W
3306	4822 050 21802	1k8	1%	0,6W
3307	4822 050 21802	1k8	1%	0,6W
3308	4822 050 21802	1k8	1%	0,6W
3311	4822 100 90109	POTMETER 2x20k		
3313	4822 050 21503	15k	1%	0,6W
3314	4822 050 21503	15k	1%	0,6W
3315	4822 050 21802	1k8	1%	0,6W
3316	4822 050 21802	1k8	1%	0,6W
3357	4822 050 21802	1k8	1%	0,6W
3358	4822 050 21802	1k8	1%	0,6W
3359	4822 050 21802	1k8	1%	0,6W
3360	4822 050 21802	1k8	1%	0,6W
3365	4822 100 90108	POTMETER 20k		
3463	4822 052 10159	15R	5%	0,33W

CHIP RESISTORS

3101	4822 051 20474	470k	5%	0,1W
3102	4822 051 20474	470k	5%	0,1W
3103	4822 051 20105	1M	5%	0,1W
3104	4822 051 20103	10k	5%	0,1W
3105	4822 051 20105	1M	5%	0,1W
3106	4822 051 20104	100k	5%	0,1W
3107	4822 051 20103	10k	5%	0,1W
3109	4822 051 20472	4k7	5%	0,1W
3111	4822 051 20393	39k	5%	0,1W
3112	4822 051 20101	100R	5%	0,1W
3120	4822 051 20225	2M2	5%	0,1W
3121	4822 051 20105	1M	5%	0,1W
3122	4822 051 20223	22k	5%	0,1W
3125	4822 051 20104	100k	5%	0,1W
3127	4822 051 20561	560R	5%	0,1W
3128	4822 051 20561	560R	5%	0,1W
3129	4822 051 20473	47k	5%	0,1W
3130	4822 051 20473	47k	5%	0,1W
3131	4822 051 20473	47k	5%	0,1W
3132	4822 051 20473	47k	5%	0,1W
3133	4822 051 10102	1k	2%	0,25W
3134	4822 051 10102	1k	2%	0,25W
3135	4822 051 20122	1,2k	5%	0,1W
3136	4822 051 20122	1,2k	5%	0,1W
3137	4822 051 20332	3k3	5%	0,1W
3138	4822 051 20332	3k3	5%	0,1W
3139	4822 051 20008	CHIP JUMPER 0805		
3141	4822 051 20473	47k	5%	0,1W
3142	4822 051 20473	47k	5%	0,1W
3143	4822 051 20103	10k	5%	0,1W
3144	4822 051 20103	10k	5%	0,1W
3145	4822 051 20103	10k	5%	0,1W
3146	4822 051 20103	10k	5%	0,1W
3147	4822 051 20223	22k	5%	0,1W
3148	4822 051 20223	22k	5%	0,1W
3153	4822 051 10102	1k	2%	0,25W
3154	4822 051 20103	10k	5%	0,1W

CHIP RESISTORS

3155	4822 051 20472	4k7	5%	0,1W
3156	4822 051 20104	100k	5%	0,1W
3157	4822 051 20682	6k8	5%	0,1W
3158	4822 051 20472	4k7	5%	0,1W
3159	4822 051 10102	1k	2%	0,25W
3162	4822 051 10102	1k	2%	0,25W
3163	4822 051 10102	1k	2%	0,25W
3164	4822 051 20271	270R	5%	0,1W
3165	4822 051 20271	270R	5%	0,1W
3166	4822 051 20271	270R	5%	0,1W
3167	4822 051 20104	100k	5%	0,1W
3168	4822 051 20104	100k	5%	0,1W
3169	4822 051 20103	10k	5%	0,1W
3170	4822 051 20103	10k	5%	0,1W
3171	4822 051 20123	12k	2%	0,1W
3172	4822 051 20123	12k	2%	0,1W
3173	4822 051 20183	18k	5%	0,1W
3174	4822 051 20153	15k	5%	0,1W
3175	4822 051 20331	330R	5%	0,1W
3176	4822 051 20331	330R	5%	0,1W
3177	4822 051 10102	1k	2%	0,25W
3178	4822 051 20103	10k	5%	0,1W
3179	4822 051 20472	4k7	5%	0,1W
3181	4822 051 20103	10k	5%	0,1W
3182	4822 051 20103	10k	5%	0,1W
3183	4822 051 20103	10k	5%	0,1W
3184	4822 051 20103	10k	5%	0,1W
3185	4822 051 20103	10k	5%	0,1W
3186	4822 051 20223	22k	5%	0,1W
3187	4822 051 20222	2k2	5%	0,1W
3188	4822 051 20103	10k	5%	0,1W
3189	4822 051 20473	47k	5%	0,1W
3190	4822 051 10102	1k	2%	0,25W
3191	4822 051 20103	10k	5%	0,1W
3192	4822 051 10102	1k	2%	0,25W
3193	4822 051 20334	330k	5%	0,1W
3194	4822 051 20225	2M2	5%	0,1W
3195	4822 051 20104	100k	5%	0,1W
3196	4822 051 20153	15k	5%	0,1W
3197	4822 051 20472	4k7	5%	0,1W
3198	4822 051 20224	220k	5%	0,1W
3199	4822 051 20122	1,2k	5%	0,1W
3200	4822 051 20152	1k5	5%	0,1W
3201	4822 051 20103	10k	5%	0,1W
3202	4822 051 20103	10k	5%	0,1W
3204	4822 051 20471	470R	5%	0,1W
3205	4822 051 10102	1k	2%	0,25W
3207	4822 051 20471	470R	5%	0,1W
3208	4822 051 20821	820R	5%	0,1W
3210	4822 051 20471	470R	5%	0,1W
3211	4822 051 10102	1k	2%	0,25W
3212	4822 051 20153	15k	5%	0,1W
3213	4822 051 20103	10k	5%	0,1W
3215	4822 051 20103	10k	5%	0,1W
3217	4822 051 20331	330R	5%	0,1W
3218	4822 051 20331	330R	5%	0,1W
3219	4822 051 20152	1k5	5%	0,1W
3220	4822 051 10102	1k	2%	0,25W
3221	4822 051 20123	12k	2%	0,1W
3222	4822 051 20103	10k	5%	0,1W
3223	4822 051 20183	18k	5%	0,1W
3224	4822 051 20332	3k3	5%	0,1W
3225	4822 051 20332	3k3	5%	0,1W
3226	4822 051 20473	47k	5%	0,1W

CHIP RESISTORS

3227	4822 051 20473	47k	5%	0,1W
3228	4822 051 20223	22k	5%	0,1W
3230	4822 051 20101	100R	5%	0,1W
3231	4822 051 20479	47R	5%	0,1W
3232	4822 051 20473	47k	5%	0,1W
3233	4822 051 20473	47k	5%	0,1W
3234	4822 051 20332	3k3	5%	0,1W
3235	4822 051 10102	1k	2%	0,25W
3236	4822 051 20152	1k5	5%	0,1W
3237	4822 051 20472	4k7	5%	0,1W
3238	4822 051 20331	330R	5%	0,1W
3240	4822 051 20103	10k	5%	0,1W
3241	4822 051 20104	100k	5%	0,1W
3242	4822 051 20104	100k	5%	0,1W
3243	4822 051 20103	10k	5%	0,1W
3244	4822 051 20473	47k	5%	0,1W
3245	4822 051 20103	10k	5%	0,1W
3246	4822 051 20103	10k	5%	0,1W
3247	4822 051 20472	4k7	5%	0,1W
3248	4822 051 20331	330R	5%	0,1W
3249	4822 051 20103	10k	5%	0,1W
3250	4822 051 20472	4k7	5%	0,1W
3251	4822 051 10102	1k	2%	0,25W
3252	4822 051 10102	1k	2%	0,25W
3253	4822 051 10102	1k	2%	0,25W
3254	4822 051 10102	1k	2%	0,25W
3255	4822 051 10102	1k	2%	0,25W
3256	4822 051 10102	1k	2%	0,25W
3257	4822 051 10102	1k	2%	0,25W
3258	4822 051 10102	1k	2%	0,25W
3259	4822 051 20681	680R	5%	0,1W
3260	4822 051 20681	680R	5%	0,1W
3261	4822 051 20225	2M2	5%	0,1W
3262	4822 051 10102	1k	2%	0,25W
3263	4822 051 20123	12k	2%	0,1W
3264	4822 100 11681	POTMETER 1k LIN		
3265	4822 051 20154	150k	5%	0,1W
3266	4822 051 20472	4k7	5%	0,1W
3267	4822 051 20392	3k9	5%	0,1W
3268	4822 051 20103	10k	5%	0,1W
3269	4822 051 20104	100k	5%	0,1W
3270	4822 051 20104	100k	5%	0,1W
3271	4822 051 20271	270R	5%	0,1W
3272	4822 051 20103	10k	5%	0,1W
3273	4822 051 20103	10k	5%	0,1W
3274	4822 051 20229	22R	5%	0,1W
3275	4822 051 20221	220R	5%	0,1W
3276	4822 051 20472	4k7	5%	0,1W
3278	4822 051 20471	470R	5%	0,1W
3279	4822 051 20472	4k7	5%	0,1W
3280	4822 100 11676	POTMETER 10k LIN		
3281	4822 051 20229	22R	5%	0,1W
3282	4822 051 20471	470R	5%	0,1W
3283	4822 051 20471	470R	5%	0,1W
3284	4822 051 20471	470R	5%	0,1W
3285	4822 051 20471	470R	5%	0,1W
3286	4822 051 20103	10k	5%	0,1W
3287	4822 051 20103	10k	5%	0,1W
3288	4822 051 20273	27k	5%	0,1W
3289	4822 051 20104	100k	5%	0,1W
3290	4822 051 20104	100k	5%	0,1W
3291	4822 051 20759	75R	5%	0,1W
3292	4822 051 20228	2R2	5%	0,1 W
3293	4822 051 20228	2R2	5%	0,1 W

CHIP RESISTORS

3294	4822 051 20681	680R	5%	0,1W
3295	4822 051 20561	560R	5%	0,1W
3296	4822 051 20104	100k	5%	0,1W
3297	4822 051 20562	5k6	5%	0,1W
3298	4822 051 20221	220R	5%	0,1W
3299	4822 051 20271	270R	5%	0,1W
3300	4822 051 20104	100k	5%	0,1W
3301	4822 051 20471	470R	5%	0,1W
3302	4822 051 20471	470R	5%	0,1W
3303	4822 051 20104	100k	5%	0,1W
3304	4822 051 20104	100k	5%	0,1W
3309	4822 051 20471	470R	5%	0,1W
3310	4822 051 20471	470R	5%	0,1W
3317	4822 051 20154	150k	5%	0,1W
3318	4822 051 20682	6k8	5%	0,1W
3319	4822 051 20473	47k	5%	0,1W
3320	4822 051 20473	47k	5%	0,1W
3321	4822 051 10102	1k	2%	0,25W
3322	4822 051 10102	1k	2%	0,25W
3323	4822 051 20473	47k	5%	0,1W
3324	4822 051 20473	47k	5%	0,1W
3325	4822 100 11676	POTMETER 10k LIN		
3326	4822 100 11676	POTMETER 10k LIN		
3327	4822 051 20103	10k	5%	0,1W
3328	4822 051 20103	10k	5%	0,1W
3329	4822 051 20563	56k	5%	0,1W
3330	4822 051 20563	56k	5%	0,1W
3331	4822 051 20472	4k7	5%	0,1W
3332	4822 051 20472	4k7	5%	0,1W
3333	4822 051 20223	22k	5%	0,1W
3334	4822 051 20223	22k	5%	0,1W
3335	4822 051 20823	82k	5%	0,1W
3336	4822 051 20823	82k	5%	0,1W
3338	4822 051 20472	4k7	5%	0,1W
3339	4822 051 20243	24k	2%	0,1W
3340	4822 051 20243	24k	2%	0,1W
3341	4822 051 20561	560R	5%	0,1W
3342	4822 051 20561	560R	5%	0,1W
3343	4822 051 10102	1k	2%	0,25W
3344	4822 051 20273	27k	5%	0,1W
3345	4822 051 20471	470R	5%	0,1W
3346	4822 051 20222	2k2	5%	0,1W
3347	4822 051 20472	4k7	5%	0,1W
3348	4822 051 20473	47k	5%	0,1W
3349	4822 051 20473	47k	5%	0,1W
3350	4822 051 10102	1k	2%	0,25W
3351	4822 051 20473	47k	5%	0,1W
3352	4822 051 20473	47k	5%	0,1W
3353	4822 051 20151	150R	5%	0,1W
3354	4822 051 20151	150R	5%	0,1W
3355	4822 051 20103	10k	5%	0,1W
3356	4822 051 20103	10k	5%	0,1W
3361	4822 051 20103	10k	5%	0,1W
3362	4822 051 20103	10k	5%	0,1W
3363	4822 051 20151	150R	5%	0,1W
3364	4822 051 20151	150R	5%	0,1W
3367	4822 051 20103	10k	5%	0,1W
3368	4822 051 20103	10k	5%	0,1W
3369	4822 051 20103	10k	5%	0,1W
3370	4822 051 20103	10k	5%	0,1W
3371	4822 051 20472	4k7	5%	0,1W
3372	4822 051 20472	4k7	5%	0,1W
3373	4822 051 20104	100k	5%	0,1W
3374	4822 051 20104	100k	5%	0,1W

CHIP RESISTORS

3375	4822 051 20101	100R	5%	0,1W
3376	4822 051 20101	100R	5%	0,1W
3377	4822 051 20689	68R	5%	0,1W
3378	4822 051 20689	68R	5%	0,1W
3379	4822 051 20224	220k	5%	0,1W
3380	4822 051 20224	220k	5%	0,1W
3381	4822 051 20152	1k5	5%	0,1W
3382	4822 051 20152	1k5	5%	0,1W
3383	4822 051 20123	12k	2%	0,1W
3384	4822 051 20123	12k	2%	0,1W
3385	4822 051 20224	220k	5%	0,1W
3386	4822 051 20473	47k	5%	0,1W
3387	4822 051 20472	4k7	5%	0,1W
3388	4822 051 20682	6k8	5%	0,1W
3389	4822 051 20222	2k2	5%	0,1W
3390	4822 051 20105	1M	5%	0,1W
3391	4822 051 20103	10k	5%	0,1W
3392	4822 051 20472	4k7	5%	0,1W
3393	4822 051 20103	10k	5%	0,1W
3394	4822 051 20103	10k	5%	0,1W
3395	4822 051 20103	10k	5%	0,1W
3396	4822 051 20103	10k	5%	0,1W
3397	4822 051 20103	10k	5%	0,1W
3398	4822 051 20103	10k	5%	0,1W
3399	4822 051 20472	4k7	5%	0,1W

4101	4822 051 10008	CHIP JUMPER 1206
4102	4822 051 10008	CHIP JUMPER 1206
4103	4822 051 10008	CHIP JUMPER 1206
4104	4822 051 10008	CHIP JUMPER 1206
4105	4822 051 10008	CHIP JUMPER 1206
4106	4822 051 10008	CHIP JUMPER 1206
4107	4822 051 10008	CHIP JUMPER 1206
4108	4822 051 10008	CHIP JUMPER 1206
4109	4822 051 10008	CHIP JUMPER 1206
4110	4822 051 10008	CHIP JUMPER 1206
4111	4822 051 10008	CHIP JUMPER 1206
4112	4822 051 10008	CHIP JUMPER 1206
4114	4822 051 10008	CHIP JUMPER 1206
4115	4822 051 10008	CHIP JUMPER 1206
4116	4822 051 10008	CHIP JUMPER 1206
4117	4822 051 10008	CHIP JUMPER 1206
4118	4822 051 10008	CHIP JUMPER 1206
4119	4822 051 10008	CHIP JUMPER 1206
4120	4822 051 10008	CHIP JUMPER 1206
4121	4822 051 10008	CHIP JUMPER 1206
4122	4822 051 10008	CHIP JUMPER 1206
4123	4822 051 10008	CHIP JUMPER 1206
4124	4822 051 10008	CHIP JUMPER 1206
4125	4822 051 10008	CHIP JUMPER 1206
4128	4822 051 20008	CHIP JUMPER 0805
4136	4822 051 10008	CHIP JUMPER 1206
4137	4822 051 10008	CHIP JUMPER 1206
4138	4822 051 10008	CHIP JUMPER 1206
4139	4822 051 10008	CHIP JUMPER 1206
4140	4822 051 10008	CHIP JUMPER 1206
4141	4822 051 10008	CHIP JUMPER 1206
4142	4822 051 10008	CHIP JUMPER 1206
4143	4822 051 10008	CHIP JUMPER 1206
4144	4822 051 10008	CHIP JUMPER 1206
4145	4822 051 10008	CHIP JUMPER 1206
4146	4822 051 10008	CHIP JUMPER 1206
4147	4822 051 10008	CHIP JUMPER 1206
4148	4822 051 10008	CHIP JUMPER 1206
4149	4822 051 10008	CHIP JUMPER 1206

CHIP RESISTORS

4150	4822 051 10008	CHIP JUMPER 1206
4151	4822 051 10008	CHIP JUMPER 1206
4152	4822 051 10008	CHIP JUMPER 1206
4153	4822 051 10008	CHIP JUMPER 1206
4154	4822 051 10008	CHIP JUMPER 1206
4155	4822 051 10008	CHIP JUMPER 1206
4156	4822 051 10008	CHIP JUMPER 1206
4157	4822 051 10008	CHIP JUMPER 1206
4158	4822 051 10008	CHIP JUMPER 1206
4159	4822 051 10008	CHIP JUMPER 1206
4160	4822 051 10008	CHIP JUMPER 1206
4162	4822 051 10008	CHIP JUMPER 1206
4163	4822 051 10008	CHIP JUMPER 1206
4164	4822 051 10008	CHIP JUMPER 1206
4165	4822 051 10008	CHIP JUMPER 1206
4166	4822 051 10008	CHIP JUMPER 1206
4167	4822 051 10008	CHIP JUMPER 1206
4168	4822 051 10008	CHIP JUMPER 1206
4170	4822 051 10008	CHIP JUMPER 1206
4171	4822 051 10008	CHIP JUMPER 1206
4172	4822 051 10008	CHIP JUMPER 1206
4173	4822 051 10008	CHIP JUMPER 1206
4174	4822 051 10008	CHIP JUMPER 1206
4901	4822 051 20008	CHIP JUMPER 0805
4902	4822 051 20008	CHIP JUMPER 0805
4903	4822 051 20008	CHIP JUMPER 0805
4904	4822 051 20008	CHIP JUMPER 0805
4905	4822 051 20008	CHIP JUMPER 0805

CAPACITORS

2103	4822 124 40433	47µF	20%	25V
2105	5322 121 42489	33nF	5%	100V
2107	4822 124 40435	10µF	20%	50V
2231	4822 124 41584	100µF	20%	10V
2232	4822 124 41584	100µF	20%	10V
2250	4822 124 40433	47µF	20%	25V
2251	4822 124 80411	3300µF	20%	16V
2253	4822 124 40433	47µF	20%	25V
2257	4822 124 41997	470pF	20%	10V
2262	4822 124 22263	220µF	20%	25V
2267	4822 124 22263	220µF	20%	25V
2270	4822 124 40433	47µF	20%	25V
2271	4822 124 40433	47µF	20%	25V
2281	4822 124 40433	47µF	20%	25V
2294	4822 124 40435	10µF	20%	50V
2301	4822 124 41584	100µF	20%	10V
2302	4822 124 41584	100µF	20%	10V
2303	4822 124 22263	220µF	20%	25V
2304	4822 124 22263	220µF	20%	25V
2305	4822 124 40433	47µF	20%	25V
2306	4822 124 40433	47µF	20%	25V
2325	4822 121 51472	39nF	5%	250V
2326	4822 121 51472	39nF	5%	250V
2331	4822 124 40433	47µF	20%	25V
2332	4822 124 40433	47µF	20%	25V
2335	4822 124 41643	100µF	20%	16V
2336	4822 124 41643	100µF	20%	16V
2337	4822 121 51412	560nF	5%	63V
2338	4822 121 51412	560nF	5%	63V
2339	4822 121 43635	330nF	10%	63V
2340	4822 121 43635	330nF	10%	63V
2357	4822 124 41584	100µF	20%	10V
2358	4822 124 41584	100µF	20%	10V
2359	4822 124 41643	100µF	20%	16V

CAPACITORS

2360	4822 124 41643	100µF	20%	16V
2365	4822 124 40433	47µF	20%	25V
2366	4822 124 40433	47µF	20%	25V
2369	4822 124 41643	100µF	20%	16V
2370	4822 124 41643	100µF	20%	16V
2373	4822 124 40768	0,47µF	20%	100V
2377	5322 121 42502	390nF	5%	63V
2378	4822 124 41643	100µF	20%	16V
2385	4822 124 41584	100µF	20%	10V
2386	4822 124 41584	100µF	20%	10V
2388	4822 124 41997	470pF	20%	10V
2391	5322 124 41431	22µF	20%	25V
2393	4822 124 40433	47µF	20%	25V
2394	5322 124 41431	22µF	20%	25V
2395	5322 124 41431	22µF	20%	25V
2397	4822 124 41583	0,68µF	bipolar	
2399	4822 124 80409	2200µF	20%	16V
2450	4822 124 22263	220µF	20%	25V

CHIP CAPACITORS

2101	4822 122 33575	220pF	5%	50V
2102	5322 122 34123	1nF	10%	50V
2104	5322 122 34123	1nF	10%	50V
2106	4822 122 33496	100nF	10%	63V
2108	4822 122 33891	3,3nF	10%	63V
2241	5322 122 32654	22nF	10%	63V
2242	5322 122 32654	22nF	10%	63V
2247	5322 122 32531	100pF	5%	50V
2248	5322 122 32531	100pF	5%	50V
2249	4822 126 10002	100nF	20%	50V
2252	5322 122 32654	22nF	10%	63V
2254	5322 122 32654	22nF	10%	63V
2255	5322 122 32531	100pF	5%	50V
2256	5322 122 32654	22nF	10%	63V
2259	5322 122 32654	22nF	10%	63V
2260	5322 122 32531	100pF	5%	50V
2261	5322 122 32654	22nF	10%	63V
2264	5322 122 32654	22nF	10%	63V
2265	5322 122 32531	100pF	5%	50V
2266	5322 122 32654	22nF	10%	63V
2268	5322 122 32654	22nF	10%	63V
2269	5322 122 32654	22nF	10%	63V
2272	4822 122 33177	10nF	20%	50V
2273	4822 122 33177	10nF	20%	50V
2275	4822 126 10002	100nF	20%	50V
2276	4822 126 10002	100nF	20%	50V
2277	4822 126 10002	100nF	20%	50V
2278	4822 126 10002	100nF	20%	50V
2279	4822 126 10002	100nF	20%	50V
2280	4822 126 10002	100nF	20%	50V
2283	4822 126 10002	100nF	20%	50V
2284	4822 122 33177	10nF	20%	50V
2285	4822 122 33325	470nF	20%	50V
2286	4822 122 33177	10nF	20%	50V
2287	4822 122 33891	3,3nF	10%	63V
2288	4822 122 33891	3,3nF	10%	63V
2289	4822 122 33177	10nF	20%	50V
2290	4822 122 33177	10nF	20%	50V
2291	5322 122 32531	100pF	5%	50V
2292	5322 122 32531	100pF	5%	50V
2296	4822 126 10002	100nF	20%	50V
2298	4822 126 10002	100nF	20%	50V
2300	5322 122 32268	470pF	10%	50V
2307	5322 122 32452	47pF	5%	50V

CHIP CAPACITORS

2308	5322 122 32452	47pF	5%	50V
2309	4822 122 33891	3,3nF	10%	63V
2310	4822 122 33891	3,3nF	10%	63V
2311	4822 126 10002	100nF	20%	50V
2312	4822 126 10002	100nF	20%	50V
2313	4822 126 10002	100nF	20%	50V
2314	4822 126 10002	100nF	20%	50V
2315	5322 122 32268	470pF	10%	50V
2316	5322 122 32268	470pF	10%	50V
2317	5322 122 32452	47pF	5%	50V
2318	5322 122 32452	47pF	5%	50V
2319	5322 122 32452	47pF	5%	50V
2320	5322 122 32452	47pF	5%	50V
2321	5322 122 32531	100pF	5%	50V
2322	5322 122 32531	100pF	5%	50V
2323	4822 126 10002	100nF	20%	50V
2324	4822 126 10002	100nF	20%	50V
2327	5322 122 32268	470pF	10%	50V
2328	5322 122 32268	470pF	10%	50V
2329	4822 122 33806	820pF	10%	63V
2330	4822 122 33806	820pF	10%	63V
2341	5322 122 32531	100pF	5%	50V
2342	5322 122 32531	100pF	5%	50V
2343	4822 126 10002	100nF	20%	50V
2344	4822 126 10002	100nF	20%	50V
2345	4822 122 32999	2,2nF	5%	
2346	4822 122 32999	2,2nF	5%	
2347	4822 122 32999	2,2nF	5%	
2348	4822 122 32999	2,2nF	5%	
2349	4822 122 32999	2,2nF	5%	
2350	4822 122 32999	2,2nF	5%	
2351	5322 122 32268	470pF	10%	50V
2352	5322 122 32268	470pF	10%	50V
2353	4822 126 10002	100nF	20%	50V
2354	4822 126 10002	100nF	20%	50V
2355	4822 126 10002	100nF	20%	50V
2356	4822 126 10002	100nF	20%	50V
2361	4822 126 10002	100nF	20%	50V
2362	4822 126 10002	100nF	20%	50V
2363	4822 122 32999	2,2nF	5%	
2364	4822 122 32999	2,2nF	5%	
2367	4822 122 32999	2,2nF	5%	
2368	4822 122 32999	2,2nF	5%	
2371	4822 122 33797	47nF	20%	50V
2372	5322 122 32654	22nF	10%	63V
2374	4822 122 33342	33nF	10%	63V
2375	4822 122 33177	10nF	20%	50V
2376	4822 122 32927	220nF	10%	63V
2379	5322 122 32531	100pF	5%	50V
2381	4822 122 33797	47nF	20%	50V
2383	4822 122 33177	10nF	20%	50V
2384	4822 126 10002	100nF	20%	50V
2387	4822 126 10002	100nF	20%	50V
2390	4822 126 10002	100nF	20%	50V
2392	4822 126 10002	100nF	20%	50V
2396	4822 122 32927	220nF	10%	63V
2398	4822 122 33177	10nF	20%	50V

FRONT BOARD (PCB 4)

MISCELLANEOUS

1400	4822 130 91259	DISPLAY
1401	4822 276 13355	TACT SWITCH
1402	4822 276 13355	TACT SWITCH
1403	4822 276 13355	TACT SWITCH
1404	4822 276 13355	TACT SWITCH
1405	4822 276 13355	TACT SWITCH
1406	4822 276 13066	TACT SWITCH
1407	4822 276 13355	TACT SWITCH
1408	4822 276 13355	TACT SWITCH
1409	4822 276 13355	TACT SWITCH
1410	4822 276 13355	TACT SWITCH
1411	4822 276 13355	TACT SWITCH
1412	4822 276 13355	TACT SWITCH
1413	4822 276 13355	TACT SWITCH
1414	4822 276 13355	TACT SWITCH
1415	4822 276 13355	TACT SWITCH
1416	4822 276 13355	TACT SWITCH
1417	4822 276 13355	TACT SWITCH
1418	4822 276 13355	TACT SWITCH
1419	4822 276 13355	TACT SWITCH
1420	4822 276 13355	TACT SWITCH
1421	4822 276 13355	TACT SWITCH

DIODES

6411	5322 130 31928	BAS16
6412	5322 130 31928	BAS16
6413	5322 130 31928	BAS16
6414	5322 130 31928	BAS16
6421	5322 130 31928	BAS16
6422	5322 130 31928	BAS16

TRANSISTORS

7402	4822 130 60511	BC847B
7403	4822 130 60511	BC847B
7405	5322 130 60123	BC807-40
7406	5322 130 60123	BC807-40
7407	4822 130 42615	BC817-40
7408	4822 130 42615	BC817-40
7414	4822 130 61207	BC848
7416	4822 130 61207	BC848
7451	4822 130 61207	BC848
7452	4822 130 61207	BC848
7453	4822 130 61207	BC848
7454	4822 130 61207	BC848
7455	4822 130 61207	BC848
7456	4822 130 61207	BC848
7465	5322 130 41982	BC848
7466	5322 130 41982	BC848
7467	5322 130 41982	BC848
7468	5322 130 41982	BC848

INTEGRATED CIRCUITS

7401	4822 209 32528	TMP87PM70F
7410	4822 214 51795	IR RECEIVER GP1U500X
7411	4822 209 83357	NJM4560M
7412	4822 209 83357	NJM4560M
7413	4822 209 83357	NJM4560M
7471	4822 209 32002	NJM5532MD

COILS

5401	5322 242 73697	CERAM.RES. 8MHz
5410	4822 157 70298	15µH

RESISTORS

3312	4822 102 10457	POTMETER 2x20k

CHIP RESISTORS

3400	4822 051 20103	10k	5%	0,1W
3413	4822 051 20103	10k	5%	0,1W
3415	4822 051 20103	10k	5%	0,1W
3416	4822 051 20103	10k	5%	0,1W
3417	4822 051 20683	68k	5%	0,1W
3418	4822 051 20683	68k	5%	0,1W
3419	4822 051 20473	47k	5%	0,1W
3421	4822 051 20104	100k	5%	0,1W
3422	4822 051 20104	100k	5%	0,1W
3423	4822 051 20563	56k	5%	0,1W
3424	4822 051 20563	56k	5%	0,1W
3425	4822 051 20102	1k	5%	0,1W
3426	4822 051 20102	1k	5%	0,1W
3427	4822 051 20121	120R	5%	0,1W
3428	4822 051 20121	120R	5%	0,1W
3429	4822 051 20104	100k	5%	0,1W
3430	4822 051 20104	100k	5%	0,1W
3431	4822 051 20472	4k7	5%	0,1W
3432	4822 051 20472	4k7	5%	0,1W
3433	4822 051 20472	4k7	5%	0,1W
3434	4822 051 20472	4k7	5%	0,1W
3435	4822 051 20684	680k	5%	0,1W
3436	4822 051 20684	680k	5%	0,1W
3437	4822 051 20684	680k	5%	0,1W
3438	4822 051 20684	680k	5%	0,1W
3439	4822 051 20103	10k	5%	0,1W
3440	4822 051 20103	10k	5%	0,1W
3441	4822 051 20103	10k	5%	0,1W
3442	4822 051 20103	10k	5%	0,1W
3444	4822 051 20331	330R	5%	0,1W
3445	4822 051 20331	330R	5%	0,1W
3446	4822 051 20331	330R	5%	0,1W
3447	4822 051 20331	330R	5%	0,1W
3448	4822 051 20332	3k3	5%	0,1W
3449	4822 051 20332	3k3	5%	0,1W
3451	4822 051 20103	10k	5%	0,1W
3452	4822 051 20103	10k	5%	0,1W
3453	4822 051 20103	10k	5%	0,1W
3454	4822 051 20103	10k	5%	0,1W
3455	4822 051 20103	10k	5%	0,1W
3456	4822 051 20103	10k	5%	0,1W
3457	4822 051 20103	10k	5%	0,1W
3458	4822 051 20103	10k	5%	0,1W
3459	4822 051 20103	10k	5%	0,1W
3464	4822 051 20101	100R	5%	0,1W
3465	4822 051 20223	22k	5%	0,1W
3467	4822 051 20222	2k2	5%	0,1W
3468	4822 051 20222	2k2	5%	0,1W
3470	4822 051 10102	1k	2%	0,25W
3471	4822 051 20153	15k	5%	0,1W
3472	4822 051 20153	15k	5%	0,1W
3473	4822 051 20109	10R	5%	0,1W
3474	4822 051 20109	10R	5%	0,1W
3481	4822 051 20103	10k	5%	0,1W
3482	4822 051 20103	10k	5%	0,1W

CAPACITORS

2438	4822 124 80115	4,7µF	20%	25V
2449	4822 124 23178	47µF	20%	16V

CHIP CAPACITORS

2432	4822 126 10002	100nF	20%	50V
2435	4822 126 10002	100nF	20%	50V
2436	4822 126 10002	100nF	20%	50V
2437	4822 126 10002	100nF	20%	50V
2441	4822 122 33325	470nF	20%	50V
2442	4822 122 33325	470nF	20%	50V
2443	4822 122 33325	470nF	20%	50V
2444	4822 122 33325	470nF	20%	50V
2445	4822 122 33325	470nF	20%	50V
2446	4822 122 33325	470nF	20%	50V
2447	4822 122 33325	470nF	20%	50V
2448	4822 122 33325	470nF	20%	50V
2451	4822 122 33177	10nF	20%	50V
2452	4822 126 10002	100nF	20%	50V
2453	4822 126 10002	100nF	20%	50V
2455	4822 126 10002	100nF	20%	50V
2475	5322 116 80853	560pF	5%	63V
2481	4822 122 33177	10nF	20%	50V
2482	4822 122 33177	10nF	20%	50V

DIGITAL BOARD (PCB 5)

MISCELLANEOUS

	4822 214 33899	DIGITAL BOARD COMPL.

DIODES

6501	5322 130 31928	BAS16
6502	4822 130 83249	BZX84-B3V6
6503	5322 130 31928	BAS16
6504	4822 130 82594	BAT54C

TRANSISTORS

7513	5322 130 41982	BC848
7521	5322 130 41982	BC848
7522	5322 130 41982	BC848
7523	5322 130 41983	BC858B
7524	5322 130 41982	BC848
7525	5322 130 41982	BC848

INTEGRATED CIRCUITS

7500	4822 209 30144	PC74HC4046AT
7501	4822 209 30718	M51581FP (DAI)
7502	4822 209 32004	SAA2011GP (ADAS)
7503	4822 209 32005	SAA2021GP (SBC)
7504	4822 209 32003	SAA2001GP (SBF)
7505	4822 209 32003	SAA2001GP (SBF)
7506	4822 209 32007	SAA2041GP (DDSP)
7507	4822 209 31999	MN41464
7508	4822 209 32008	SAA2051GP (DEQ2)
7509	4822 209 32006	SAA2031GP (ERCO)
7510	4822 209 30606	MM74HCU04M
7511	4822 209 30706	SAA7321GP/M5 (DAC)
7512	4822 209 73157	NJM3415M
7514	4822 209 31622	AK5339 (ADC)
7515	5322 209 12479	PC74HCT374T

COILS

5501	4822 157 70299	2,2µH
5502	4822 157 70299	2,2µH
5503	4822 157 70299	2,2µH
5504	4822 157 70299	2,2µH
5505	4822 242 81361	LC-FILTER 35MHz
5507	4822 157 70299	2,2µH
5508	4822 157 70299	2,2µH
5509	4822 157 70299	2,2µH
5510	4822 242 81361	LC-FILTER 35MHz
5511	4822 157 70299	2,2µH
5531	4822 157 70301	560µH
5532	4822 157 70301	560µH
5550	4822 242 81358	X-TAL 24,576MHz
5551	4822 242 81359	X-TAL 22,579MHz
5555	4822 157 70299	2,2µH
5556	4822 157 70299	2,2µH

CHIP RESISTORS

3501	4822 051 20229	22R	5%	0,1W
3502	4822 051 20229	22R	5%	0,1W
3503	4822 051 20229	22R	5%	0,1W
3504	4822 051 20479	47R	5%	0,1W
3505	4822 051 20479	47R	5%	0,1W

CHIP RESISTORS

3506	4822 051 20105	1M	5%	0,1W
3507	4822 051 10102	1k	2%	0,25W
3508	4822 051 20105	1M	5%	0,1W
3509	4822 051 10102	1k	2%	0,25W
3510	4822 051 20479	47R	5%	0,1W
3511	4822 051 20479	47R	5%	0,1W
3512	4822 051 20122	1k2	5%	0,1W
3513	4822 051 20222	2k2	5%	0,1W
3514	4822 051 20222	2k2	5%	0,1W
3515	4822 051 20104	100k	5%	0,1W
3516	4822 051 20103	10k	5%	0,1W
3517	4822 051 20104	100k	5%	0,1W
3518	4822 051 20101	100R	5%	0,1W
3519	4822 051 20123	12k	2%	0,1W
3520	4822 051 20222	2k2	5%	0,1W
3521	4822 051 20272	2k7	5%	0,1W
3522	4822 051 20123	12k	2%	0,1W
3523	4822 051 20121	120R	5%	0,1W
3524	4822 051 20122	1k2	5%	0,1W
3525	4822 051 20181	180R	5%	0,1W
3526	4822 051 20221	220R	5%	0,1W
3527	4822 051 20153	15k	5%	0,1W
3528	4822 051 20101	100R	5%	0,1W
3529	4822 051 20331	330R	5%	0,1W
3530	4822 051 20479	47R	5%	0,1W
3531	4822 051 20223	22k	5%	0,1W
3532	4822 051 20223	22k	5%	0,1W
3533	4822 051 20101	100R	5%	0,1W
3534	4822 051 20479	47R	5%	0,1W
3535	4822 051 20228	2R2	5%	0,1 W
3536	4822 051 20479	47R	5%	0,1W
3537	4822 051 20479	47R	5%	0,1W
3538	4822 051 20223	22k	5%	0,1W
3539	4822 051 20223	22k	5%	0,1W
3540	4822 051 10102	1k	2%	0,25W
3541	4822 051 20472	4k7	5%	0,1W
3542	4822 051 20104	100k	5%	0,1W
3543	4822 051 20472	4k7	5%	0,1W
3544	4822 051 20103	10k	5%	0,1W
3545	4822 051 20472	4k7	5%	0,1W
3546	4822 051 20333	33k	5%	0,1W
3547	4822 051 20333	33k	5%	0,1W
3548	4822 051 20682	6k8	5%	0,1W
3549	4822 051 20472	4k7	5%	0,1W
3550	4822 100 11956	POTMETER 10k		
3551	4822 051 20479	47R	5%	0,1W
3552	4822 051 20479	47R	5%	0,1W
3553	4822 051 20103	10k	5%	0,1W
3554	4822 051 20479	47R	5%	0,1W
3555	4822 051 20479	47R	5%	0,1W
3556	4822 051 20479	47R	5%	0,1W
3557	4822 051 20472	4k7	5%	0,1W
3558	4822 051 20472	4k7	5%	0,1W
3559	4822 051 20821	820R	5%	0,1W
3560	4822 116 30441	1k5	20%	NTC
3561	4822 051 20331	330R	5%	0,1W
3562	4822 051 20339	33R	5%	0,1W
3563	4822 051 20228	2R2	5%	0,1 W
3564	4822 051 20689	68R	5%	0,1W
3565	4822 051 52703	27k	1%	0,125W

CHIP RESISTORS

3566	4822 051 52703	27k	1%	0,125W
3567	4822 051 20105	1M	5%	0,1W
3568	4822 051 20105	1M	5%	0,1W
3569	4822 051 20103	10k	5%	0,1W
3570	4822 051 20103	10k	5%	0,1W
3571	4822 051 54702	4k7	1%	0,125W
3572	4822 051 54702	4k7	1%	0,125W
3573	4822 051 54702	4k7	1%	0,125W
3574	4822 051 54702	4k7	1%	0,125W
3575	4822 051 55602	5k6	1%	0,125W
3576	4822 051 55602	5k6	1%	0,125W
3577	4822 051 20472	4k7	5%	0,1W
3578	4822 051 20473	47k	5%	0,1W
3579	4822 051 20479	47R	5%	0,1W
3580	4822 051 20479	47R	5%	0,1W
3581	4822 051 20479	47R	5%	0,1W
3582	4822 051 20479	47R	5%	0,1W
3583	4822 051 20479	47R	5%	0,1W
3584	4822 051 20479	47R	5%	0,1W
3585	4822 051 20479	47R	5%	0,1W
3586	4822 051 20472	4k7	5%	0,1W
3587	4822 051 20472	4k7	5%	0,1W
3588	4822 051 20472	4k7	5%	0,1W
3589	4822 051 20472	4k7	5%	0,1W
3590	4822 051 20472	4k7	5%	0,1W
3591	4822 051 20473	47k	5%	0,1W
3592	4822 051 20479	47R	5%	0,1W
3593	4822 051 20689	68R	5%	0,1W
3594	4822 051 20689	68R	5%	0,1W
3595	4822 051 20479	47R	5%	0,1W
3597	4822 051 20008	CHIP JUMPER 0805		

CAPACITORS

2531	4822 121 51252	470nF	5%	63V
2532	4822 124 40433	47µF	20%	25V
2534	4822 124 41584	100µF	20%	10V
2535	4822 124 41584	100µF	20%	10V
2536	4822 124 40246	4,7uF	20%	63V
2537	4822 124 40433	47µF	20%	25V
2539	4822 124 41584	100µF	20%	10V
2544	4822 124 41997	470pF	20%	10V
2551	4822 121 41857	10nF	5%	250V
2552	4822 121 41857	10nF	5%	250V
2564	4822 124 40433	47µF	20%	25V
2581	4822 124 41584	100µF	20%	10V
2582	4822 124 41584	100µF	20%	10V
2583	4822 124 40433	47µF	20%	25V
2584	4822 124 40433	47µF	20%	25V
2585	4822 124 40435	10µF	20%	50V
2586	4822 124 40435	10µF	20%	50V
2587	4822 124 40433	47µF	20%	25V
2589	4822 124 40433	47µF	20%	25V
2590	4822 124 40433	47µF	20%	25V
2591	4822 124 40246	4,7uF	20%	63V

CHIP CAPACITORS

2500	4822 126 10002	100nF	10%	63V
2501	4822 126 10002	100nF	10%	63V
2502	4822 126 10002	100nF	10%	63V
2503	4822 126 10002	100nF	10%	63V
2504	4822 126 10002	100nF	10%	63V

CHIP CAPACITORS

2505	5322 122 32531	100pF	5%	50V
2506	5322 122 32661	56pF	5%	50V
2507	4822 126 10002	100nF	10%	63V
2508	5322 122 32481	15pF	5%	50V
2509	5322 122 31946	27pF	10%	50V
2510	5322 122 31946	27pF	10%	50V
2511	5322 122 32481	15pF	5%	50V
2512	4822 126 10002	100nF	10%	63V
2513	4822 122 33575	220pF	5%	
2514	4822 126 10002	100nF	10%	63V
2515	4822 126 10002	100nF	10%	63V
2516	4822 126 10002	100nF	10%	63V
2517	4822 126 10002	100nF	10%	63V
2518	4822 126 10002	100nF	10%	63V
2519	4822 126 10002	100nF	10%	63V
2520	5322 122 32452	47pF		
2521	5322 122 32531	100pF	5%	50V
2522	4822 126 10002	100nF	10%	63V
2523	4822 126 10002	100nF	10%	63V
2524	4822 126 10002	100nF	10%	63V
2525	4822 126 10002	100nF	10%	63V
2526	4822 126 10002	100nF	10%	63V
2527	5322 122 32452	47pF		
2528	4822 126 10002	100nF	10%	63V
2529	4822 126 10002	100nF	10%	63V
2530	4822 126 10002	100nF	10%	63V
2533	4822 126 10002	100nF	10%	63V
2538	4822 126 10002	100nF	10%	63V
2540	4822 126 10002	100nF	10%	63V
2541	5322 122 32531	100pF	5%	50V
2542	4822 126 10002	100nF	10%	63V
2543	4822 122 33608	39nF	10%	63V
2545	4822 126 10002	100nF	10%	63V
2546	5322 122 32531	100pF	5%	50V
2547	4822 122 33177	10nF	10%	50V
2548	4822 122 33177	10nF	10%	50V
2549	5322 122 32452	47pF		
2550	5322 122 32661	56pF	5%	50V
2553	4822 126 10002	100nF	10%	63V
2554	4822 126 10002	100nF	10%	63V
2555	4822 126 10002	100nF	10%	63V
2556	4822 126 10002	100nF	10%	63V
2557	4822 126 10002	100nF	10%	63V
2558	4822 126 10002	100nF	10%	63V
2559	4822 126 10002	100nF	10%	63V
2560	4822 126 10002	100nF	10%	63V
2561	4822 126 10002	100nF	10%	63V
2562	4822 126 10002	100nF	10%	63V
2563	4822 126 10002	100nF	10%	63V
2565	4822 126 10002	100nF	10%	63V
2566	4822 126 10002	100nF	10%	63V
2567	5322 116 80853	560pF	5%	50V
2568	5322 116 80853	560pF	5%	50V
2569	5322 122 32661	56pF	5%	50V
2570	5322 122 32661	56pF	5%	50V
2571	5322 126 10328	1,5nF	5%	63V
2572	5322 126 10328	1,5nF	5%	63V
2573	5322 122 32531	100pF	5%	50V
2574	5322 122 32531	100pF	5%	50V
2575	4822 122 32999	2,2nF	5%	

CHIP CAPACITORS

2576	4822 122 32999	2,2nF	5%	
2577	5322 122 32661	56pF	5%	50V
2578	5322 122 32661	56pF	5%	50V
2579	5322 122 32659	33pF	5%	
2580	5322 122 32452	47pF		
2588	5322 122 32531	100pF	5%	50V
2592	5322 122 32452	47pF		
2593	5322 122 32531	100pF	5%	50V
2594	5322 122 32531	100pF	5%	50V
2595	5322 122 32531	100pF	5%	50V
2596	5322 122 32531	100pF	5%	50V
2597	5322 122 32531	100pF	5%	50V
2598	5322 122 32531	100pF	5%	50V
2599	5322 122 32452	47pF		
2601	5322 122 32452	47pF		
2602	5322 122 32452	47pF		
2603	5322 122 32452	47pF		
2604	5322 122 31946	27pF	10%	50V
2605	5322 122 31946	27pF	10%	50V
2606	5322 122 32531	100pF	5%	50V
2607	5322 122 32531	100pF	5%	50V
2608	5322 122 32531	100pF	5%	50V
2609	5322 122 32452	47pF		
2610	5322 122 32452	47pF		

READ / WRITE BOARD (PCB 7)

DIODES

6701	5322 130 34337	BAV99
6702	5322 130 31928	BAS16

TRANSISTORS

7705	5322 130 41982	BC848
7706	5322 130 41983	BC858B
7707	5322 130 41982	BC848
7710	4822 130 42615	BC817-40
7713	5322 130 41982	BC848
7714	5322 130 41982	BC848

INTEGRATED CIRCUITS

7701	4822 209 72042	MC78L05ACP
7702	4822 209 72042	MC78L05ACP
7703	4822 209 31995	TDA1317H (READ AMPLIFIER)
7704	4822 209 31994	TDA1316T (WRITE AMPLIFIER)
7708	4822 209 72042	MC78L05ACP
7711	4822 209 31993	PLC18V8235A
7712	5322 209 71563	PC74HC02T

COILS

5701	4822 157 70299	2,2µH
5702	4822 157 70299	2,2µH
5703	4822 157 70299	2,2µH
5704	4822 157 70299	2,2µH
5705	4822 157 70299	2,2µH
5706	4822 157 70298	15µH
5707	4822 157 70298	15µH
5708	4822 157 70299	2,2µH

RESISTORS

3792	4822 116 30267	47R	NTC	

CHIP RESISTORS

3701	4822 100 11955	POTMETER 4k7		
3702	4822 051 20822	8k2	5%	0,1W
3703	4822 051 20331	330R	5%	0,1W
3704	4822 051 20123	12k	2%	0,1W
3705	4822 051 20561	560R	5%	0,1W
3706	4822 051 20471	470R	5%	0,1W
3707	4822 051 10102	1k	2%	0,25W
3709	4822 051 20104	100k	5%	0,1W
3710	4822 051 20393	39k	5%	0,1W
3711	4822 051 20471	470R	5%	0,1W
3712	4822 051 20471	470R	5%	0,1W
3713	4822 051 20471	470R	5%	0,1W
3714	4822 051 20471	470R	5%	0,1W
3715	4822 051 20471	470R	5%	0,1W
3716	4822 051 20471	470R	5%	0,1W
3717	4822 051 20471	470R	5%	0,1W
3718	4822 051 20471	470R	5%	0,1W
3719	4822 051 20471	470R	5%	0,1W
3721	4822 051 20471	470R	5%	0,1W
3722	4822 051 20008	CHIP JUMPER 0805		
3723	4822 051 20471	470R	5%	0,1W
3724	4822 051 20471	470R	5%	0,1W
3725	4822 051 20109	10R	5%	0,1W
3726	4822 051 20109	10R	5%	0,1W
3727	4822 051 20109	10R	5%	0,1W

CHIP RESISTORS

3728	4822 051 20109	10R	5%	0,1W
3729	4822 100 11955	POTMETER 4k7		
3730	4822 100 11955	POTMETER 4k7		
3731	4822 051 20473	47k	5%	0,1W
3732	4822 051 20473	47k	5%	0,1W
3733	4822 051 10102	1k	2%	0,25W
3734	4822 051 10102	1k	2%	0,25W
3735	4822 051 20333	33k	5%	0,1W
3736	4822 051 20333	33k	5%	0,1W
3737	4822 051 20154	150k	5%	0,1W
3738	4822 051 20154	150k	5%	0,1W
3739	4822 100 11955	POTMETER 4k7		
3740	4822 100 11955	POTMETER 4k7		
3741	4822 051 20229	22R	5%	0,1W
3742	4822 051 20229	22R	5%	0,1W
3743	4822 051 20229	22R	5%	0,1W
3744	4822 051 20229	22R	5%	0,1W
3745	4822 051 20229	22R	5%	0,1W
3746	4822 051 20229	22R	5%	0,1W
3747	4822 051 20229	22R	5%	0,1W
3748	4822 051 20229	22R	5%	0,1W
3749	4822 051 20229	22R	5%	0,1W
3751	4822 051 20228	2R2	5%	0,1 W
3752	4822 051 20479	47R	5%	0,1W
3754	4822 051 20561	560R	5%	0,1W
3755	4822 051 20103	10k	5%	0,1W
3756	4822 051 20181	180R	5%	0,1W
3759	4822 051 20472	4k7	5%	0,1W
3760	4822 051 20472	4k7	5%	0,1W
3761	4822 051 20473	47k	5%	0,1W
3762	4822 051 20103	10k	5%	0,1W
3763	4822 101 11246	POTMETER 100R		
3765	4822 051 20104	100k	5%	0,1W
3772	4822 051 20229	22R	5%	0,1W
3773	4822 051 20229	22R	5%	0,1W
3774	4822 051 20101	100R	5%	0,1W
3775	4822 051 20152	1k5	5%	0,1W
3776	4822 051 20279	27R	5%	0,1W
3777	4822 051 20561	560R	5%	0,1W
3778	4822 051 20182	1k8	5%	0,1W
3779	4822 051 10102	1k	2%	0,25W
3780	4822 051 20109	10R	5%	0,1W
3780	4822 051 20688	6R8	5%	0,1W
3781	4822 051 20331	330R	5%	0,1W
3782	4822 051 20479	47R	5%	0,1W
3783	4822 051 20479	47R	5%	0,1W
3784	4822 051 20479	47R	5%	0,1W
3787	4822 051 20569	56R	5%	0,1 W
3788	4822 051 20822	8k2	5%	0,1W
3789	4822 051 20008	CHIP JUMPER 0805		
3790	4822 051 20182	1k8	5%	0,1W
3791	4822 051 20689	68R	5%	0,1W
3793	4822 051 20479	47R	5%	0,1W
3794	4822 051 20008	CHIP JUMPER 0805		
3795	4822 051 20008	CHIP JUMPER 0805		
3796	4822 051 10102	1k	2%	0,25W
3797	4822 051 10102	1k	2%	0,25W
3798	4822 051 20008	CHIP JUMPER 0805		
3799	4822 051 20008	CHIP JUMPER 0805		

CAPACITORS

2702	4822 124 80408	4,7µF	20%	50V
2704	4822 124 40433	47µF	20%	25V
2706	4822 124 40196	220µF	20%	16V
2710	4822 124 41969	1µF	20%	50V
2711	4822 124 80408	4,7µF	20%	50V
2712	4822 126 11692	1µF	20%	50V
2713	4822 126 11692	1µF	20%	50V
2714	4822 126 11692	1µF	20%	50V
2715	4822 126 11692	1µF	20%	50V
2716	4822 126 11692	1µF	20%	50V
2717	4822 126 11692	1µF	20%	50V
2718	4822 126 11692	1µF	20%	50V
2719	4822 126 11692	1µF	20%	50V
2732	4822 124 23179	10µF	20%	16V
2733	4822 124 23176	22µF	20%	16V
2734	4822 124 23176	22µF	20%	16V
2735	4822 124 23179	10µF	20%	16V
2737	4822 124 41971	2,2µF	20%	50V
2738	4822 124 41971	2,2µF	20%	50V
2741	4822 124 41969	1µF	20%	50V
2742	4822 124 41969	1µF	20%	50V
2754	4822 124 40196	220µF	20%	16V
2760	4822 124 40196	220µF	20%	16V
2761	4822 124 40196	220µF	20%	16V
2765	4822 124 40196	220µF	20%	16V
2769	4822 124 40433	47µF	20%	25V

CHIP CAPACITORS

2703	5322 122 32654	22nF	10%	63V
2707	5322 122 32654	22nF	10%	63V
2708	5322 122 32654	22nF	10%	63V
2709	4822 126 10002	100nF	20%	50V
2720	4822 122 33177	10nF	20%	50V
2721	4822 122 33177	10nF	20%	50V
2722	4822 122 33177	10nF	20%	50V
2723	4822 122 33177	10nF	20%	50V
2724	4822 122 33177	10nF	20%	50V
2725	4822 122 33177	10nF	20%	50V
2726	4822 122 33177	10nF	20%	50V
2727	4822 122 33177	10nF	20%	50V
2728	4822 122 33177	10nF	20%	50V
2729	4822 122 33177	10nF	20%	50V
2730	4822 122 33177	10nF	20%	50V
2731	4822 126 10002	100nF	20%	50V
2739	4822 122 33481	1,8nF	5%	NP0
2740	4822 122 33481	1,8nF	5%	NP0
2743	4822 122 33891	3,3nF	10%	63V
2744	4822 122 33891	3,3nF	10%	63V
2745	4822 122 33891	3,3nF	10%	63V
2746	4822 122 33891	3,3nF	10%	63V
2747	4822 122 33891	3,3nF	10%	63V
2748	4822 122 33891	3,3nF	10%	63V
2749	4822 122 33891	3,3nF	10%	63V
2750	4822 122 33891	3,3nF	10%	63V
2751	4822 122 33891	3,3nF	10%	63V
2755	5322 122 32654	22nF	10%	63V
2762	5322 122 32654	22nF	10%	63V
2763	5322 122 32654	22nF	10%	63V
2764	4822 122 33177	10nF	20%	50V
2766	5322 122 32654	22nF	10%	63V
2770	4822 122 33175	2,2nF	20%	50V
2771	4822 122 33175	2,2nF	20%	50V
2772	5322 122 34123	1nF	10%	50V

CHIP CAPACITORS

2773	5322 122 32966	39pF	5%	50V
2774	5322 122 32654	22nF	10%	63V
2775	5322 122 32654	22nF	10%	63V
2776	4822 126 10002	100nF	20%	50V
2777	4822 122 33342	33nF	10%	63V
2778	4822 122 33342	33nF	10%	63V